Yours Truly
A. S. Mart

A TREATISE

ON

ARTIFICIAL LIMBS

WITH

RUBBER HANDS AND FEET

Containing a Brief History of Prothesis, Descriptions of Rubber Feet and Artificial Legs, Rubber Hands and Artificial Arms, Apparatus for Deformities, etc. An Argument on the Advisability of Applying Artificial Legs to Growing Children and to the Aged. The Longevity of the Maimed. Amputations Prothetically Considered, and the Relation of Prothesis to Surgery, etc., etc., etc., together with Awards from Industrial Expositions, Testimonials from Physicians and Patrons.

EIGHT HUNDRED ILLUSTRATIONS

A. A. MARKS

701 Broadway, New York City, U. S. A.

1901

Telephone, 778 Spring. Cable Address, "Artificial," New York. A B C Code

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PREFACE.

THIS book is a treatise on prothesis, in contradistinction to a pamphlet or catalogue. It is a dissertation on stumps, deformities, and the manner in which dismembered bodies are repaired by prothesis. The book is abundantly illustrated, in order to give clearness to the text.

An effort has been made to parallel every possible case of amputation and deformity of the extremities, or so nearly so as to convey with distinctness the methods that are to be adopted for their correction. Any person who is maimed in leg, arm, foot, or hand will be able to find a case almost identical with his own, and to learn how such case was prothetically treated. It is to be hoped that this book will dispel that gloom which naturally comes to one on whom misfortune has placed its baneful hand.

To many persons the life of a cripple is a blighted existence. The loss of a leg or an arm is a sore bereavement, but the time has arrived when remedial measures are so effective that the loss of a limb is to be regarded as a minor misfortune, not as serious as the impairment of health or the loss of any one of the senses. What has been done can be done again. The thousands of limbless persons who have had their disabilities removed are but evidences that there is a bright future and an agreeable compensation for every affliction that may happen to the human extremities.

The cuts are made from photographs taken from life. The collection of photographs, the preparation of cuts, and the arrangement of material has been a task of no mean dimensions. It has occupied a great amount of time and consumed a great amount of labor.

The illustrations begin with No. 501, and continue *ad seriatim*. This has been done to escape confusion with the illustrations in former editions.

The book, for the sake of convenience, has been divided into four parts: The first relates to artificial legs; the second, to artificial arms; the third, to general information, a part of which is of special interest to the surgical profession and to those more remotely interested in the subject; and the fourth contains indorsements from the medical and surgical professions, testimonials from the wearers and other sources.

The article on the advisability of applying artificial limbs to growing children and to the aged must be of interest to those who are concerned in the welfare of the dismembered youth and those in the decline of life. The article on the longevity of the maimed has been carefully prepared from reliable data.

The attention of the medical and surgical profession is called to the articles on "Amputations Prothetically Considered" and "Relation of Surgery to Prothesis." Comments on the author's views on the above subjects are invited.

The testimonials are arranged in the following order: Those from physicians and those from the wearers. The latter are arranged alphabetically, according to States. The addresses of the writers are not given in full, in order to protect them from the harassments of competitors.

Any correspondent who desires to communicate or confer with any number of the testimonial writers can obtain full addresses by communicating with the office. It is the wish of the house to put applicants in correspondence with those who are wearing artificial limbs, who have had an extended experience, and who reside in the same or adjacent counties.

A. A. Marks is the name of the firm, the members of which are A. A. Marks, George E. Marks, and Wm. L. Marks.

GEORGE E. MARKS, A. M.

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PART I.

ARTIFICIAL LEGS AND FEET.

A BIT OF HISTORY.

NEARLY half a century ago two brothers, natives of Connecticut and residents of New York City, embarked upon the prosthetic* industry. They were inventors and mechanics, abundantly endowed with that sympathizing nature that impels the proffering of aid to those with whom the adversities of life had been severe. D. B. Marks was the elder, and A. A. Marks the younger. Both had been prosperous in their separate vocations, but were nevertheless easily persuaded to engage in an occupation that seemed to be more congenial to their dispositions. D. B. Marks had devised a plan for an artificial leg, and, assisted by his brother, set about to develop that plan. A copartnership was formed in 1853, and the two brothers entered upon their new enterprise with much zeal, but with little familiarity with the prothetical status of those times. The artificial leg made by the new firm was put into practical use, and the success immediately achieved appears to have given them much hope. The United States Government protected the invention, and issued letters patent, bearing date March 7, 1854.

For a few months the labors of the firm met with little recognition. The demand for artificial limbs proved to be more limited than had been anticipated, and seemed to have been under the control of better known protheticians.† This condition brought discouragement; it was apparent that much sacrifice would be involved, with more gloomy prospects of success than hope had led the novices to anticipate. The senior brother became disconsolate and withdrew, resuming his former occupation. A. A. Marks adhered to his purpose. He busied himself with devising and perfecting improvements, inventing and constructing artificial arms, hands, and feet, and thus enlarging the scope of his endeavors. Through all adversity and bitter rivalry he cherished the hope that his efforts would in time make themselves felt, and that by his labor and genius the conditions of the maimed and the deformed would become bettered. He was devoted to his profession, and never entertained regret for having applied himself to an art that proved to be unremunerative for many years. He visited hospitals, interviewed prominent surgeons, made himself acquainted with the anatomy and physiology of the human extremities, he gathered points from every available source, and quietly appropri-

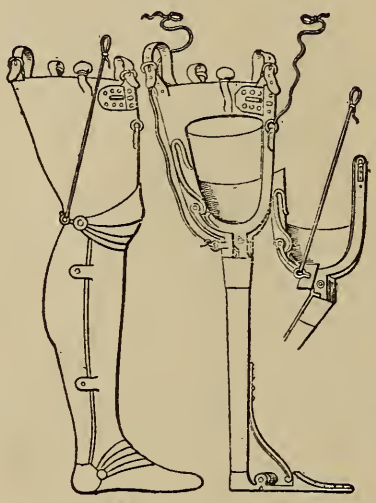
* Prosthetic—a. of prosthesis, same as prothesis. The process of adding to the human body some artificial part in place of one that may be wanting.

† Prothetician—One engaged in prothesis.

ated them to his profession. He made a close study of every case that came under his care; not a condition favorable for prosthetic purposes escaped his detection, and not a condition, however complex, puzzled his fruitful mind. His heart and his energies were devoted to one purpose and thus, by work and thought, he amply fortified himself for the results that have made him distinguished. His zeal soon brought him to the front, and many years ago he was the acknowledged authority on the subject of prosthesis.

In a few brief years Mr. Marks had amassed more experience, had conceived more ideas, had originated more systems, and had accomplished more for the relief of the maimed than the combined achievements of all who had preceded him.

A glimpse at the status of artificial-limb making, fifty years ago, is all that is necessary to show that the brainy and indefatigable New Englander had selected a field in which there were opportunities for the genius which he possessed.



No. 501. No. 502.

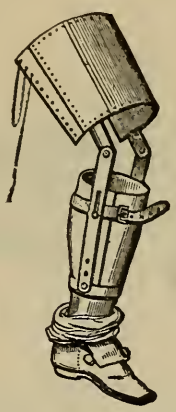
PARÉ LEG, MADE IN THE YEAR 1561.

Fifty years ago, artificial-limb making was but the relic of the sixteenth and seventeenth centuries. Prosthesis had not yet become a modern art. Appliances for the relief of the crippled that might be catalogued with artificial legs and arms were simply the reproduction of the works and ideas of mechanicians referred to by the celebrated Ambrose Paré (1561), Verduin (1696), and other early writers on medicine and surgery.

The fact is obvious that, in very early times, all persons who lost their limbs by accident, disease, or the misfortunes of war, were not doomed to a life of helplessness. The few that survived the operation and shock had some methods by which their lives might be rendered worth the living. The indigent were obliged to depend on such makeshifts as peg legs, the affluent commanded the attention and genius of the skilled mechanic, and whether he fared any better than his impecuni-

ous neighbor by having appended to his stump a mass of noisy, cumbersome machinery, is a matter for conjecture.

Prominent among the evidences that artificial legs were made in very early times is an exhibit at the Museum of the Royal College of Surgeons in London. That exhibit consists of the remains of an old artificial leg which was exhumed from a tomb at Capua in 1858. The official catalogue describes the leg thus:



No. 503.—Verduin Leg, Made in the Year 1696.

"Roman artificial leg; the artificial limb accurately represents the form of the leg; it is made with pieces of thin bronze, fastened by bronze nails to a wooden core. Two iron bars, having holes at their free ends, are attached to the upper extremity of the bronze; a quadrilateral piece of iron, found near the position of the foot, is thought to have given strength to it. There is no trace of the foot, and the wooden core had nearly crumbled away.

"The skeleton had its waist surrounded by a belt of sheet bronze, edged with small rivets, probably used to fasten a leather lining.

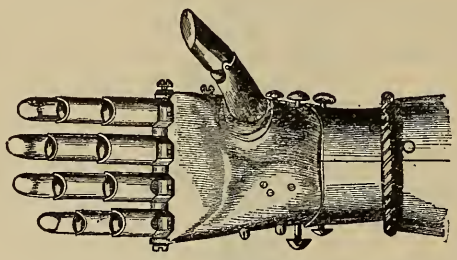
"Three painted vases (red figures on a black ground) lay at the feet of the skeleton. The vases belong to a rather advanced period in the decline of art (about 300 years B. C.)."

Herodotus tells us of an Elean, the most renowned of the Tellidæ, whom the Spartans had captured, and as they had suffered many atrocities from his hands, he was doomed to death. In this sad condition the Elean, knowing that his life was in peril and that death would follow many tortures, performed a deed beyond belief. He was confined in stocks with one foot bound in iron. He got possession of a knife, which by some means had been left near to him, and immediately cut off the broad part of his own foot. As he was guarded by sentinels outside of the wall, he dug a hole under the wall and escaped to Tegea, traveling by night and hiding himself during the day. In time he was cured of his wounds and procured a *wooden foot*, and immediately became an avowed enemy to the Lacedemonians.

Pliny tells us of M. Sergius, 167 B. C., who wore an artificial hand of his own construction, with which he fought a battle, and released Cremona from siege.

"M. Sergio ut equidem arbitror, nemo quemquam hominum jure prætulerit, licet pronepos Catilina gratiam nomini deroget. Secundo stipendio dextram manum perdidit,* . . dextram sibi ferream fecit, eaque religata prœliatus Cremonam obsidione exemit."

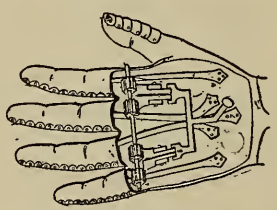
Pliny further says: "He prostrated Placentia and took twelve of the enemy's camps in Gaul; all this appears from the speech which he made on his prætorship, when his colleagues wished to shut him out of the sacred rites as a mutilated man."



No. 504.—Goetz von Berlichingen Hand, Made in the Year 1504.

The hand made for Goetz von Berlichingen in 1504 was a complicated structure, heavy and more or less cumbersome, being made of iron, but nevertheless served the purpose for which it was intended, that of holding the bridle of a horse, or a shield to protect his body. With this hand he fought at the head of the army of Margrave Frederick.

An iron arm (described by Ambrose Paré in 1564), was made for a Huguenot captain of the sixteenth century, who had his left arm shattered at the siege of Fontenoy by a shot from an arquebuse; he refused at first to have his arm amputated, stating that he would rather die than suffer amputation, as without his natural hand he would not be able to again engage in battle. His friends persuaded him at last, and the Queen of Navarre, who held him in high esteem, is said to have held his hand while it was being amputated. An iron arm was made for him, which enabled him to hold the bridle of his horse, and he returned to battle with more vigor than before.



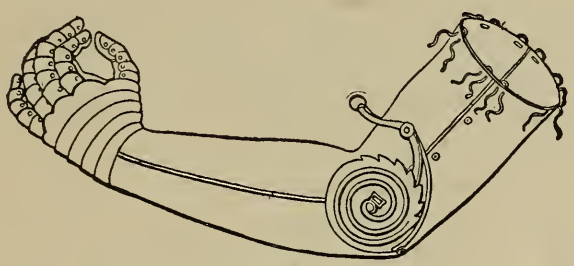
No. 505.—Paré Hand, Made in the Year 1564.

During Ambrose Paré's time much thought was given to the perfection of artificial limbs, particularly arms and hands. Iron hands were objectionable on account of their weight, and arms of leather and paper-and-glue were made in substitution. *Le petit* Lorrain, a

* C. Plinii, Hist. Nat., 28, 104-106.

French locksmith, was in all probability the most distinguished maker in those days. He operated under the suggestions of Paré, and produced limbs that were very creditable. Latterly, a Carmelite monk, Father Sebastian, devoted some attention and study to the subject, and produced an artificial arm that was capable of many articulations, employing sheet-tin and springs in its construction; but the apparatus of Father Sebastian failed to meet with anticipated success on account of the unreliability of stumps, as dependence on the firmness of tissue caused the articulations to cease as soon as the stump became attenuated.

A mechanic by the name of Bailliff is accredited with having made artificial arms that were improvements on the ideas of Father Sebastian. Some authorities, however, dispute the originality of Bailliff's arms. In 1696 a Dutch surgeon by the name of Verduin invented an artificial leg, which was improved by Serre, and met with much favor.



No. 506.

Gavin Wilson is said to have improved Father Sebastian's arm by employing harder leather, and covering the same with colored sheepskin so as to bear the appearance of human skin, and to render the deception still more complete, he made the nails of white horn, and painted them so as to represent nature.

In 1818 De Graefe suggested a mechanical procedure which is followed by European manufacturers at the present time.

Thus, step by step, with occasional lapse of time, we are brought to the present age. Cobblers, harness-makers, locksmiths, and other mechanics were the protheticians of the past. These were employed by affluent cripples in order to escape the obloquy of the peg leg (Peter Stuyvesant's style, 1620). It can well be understood that productions from those sources, although ingenious in their mechanical arrangements, were poorly adapted to the needs of the dismembered. They were heavy, noisy, clumsy, improperly fitted, and agonizing to wear; in short, they were makeshifts that would not be tolerated in the present age.

An advertisement in the *Old Countryman*, New York, in the early part of the present century, announced that one by the name of Thomas was prepared to receive orders for "Cork Legs," constructed on an advanced principle. The advanced principle appears to have been a comely and approximately natural shape given to the primitive peg leg, so that it could be worn inside of the clothing.

Up to the beginning of the present century France, Holland, and Germany were the advanced manufacturers of artificial limbs. Beginning with the present century, England seems to have taken the lead from her sister countries. In 1790 and in 1810 English patents on artificial limbs were issued to one by the name of Thomas Mann, and in 1800 James Potts of England applied for a patent on an artificial leg, which was granted by the British Government. Mr. Potts' invention consisted of a wooden leg, very simple in construction. The leg was suggested and used by the Marquess of Anglesea, who lost his leg in the battle of Waterloo. That leg has since been known by the sobriquet of the "Anglesea leg." William Selpho, an Englishman and protégé of Potts, left England and came to America in 1839, and introduced the Anglesea leg into this country. Selpho may be considered as the first manufacturer in America who attained prominence. He made an artificial leg for a young man by the name of B. F. Palmer, who, being gifted with an inventive turn of mind, sought to improve the Selpho leg, and in 1846 obtained from the United States Government the first patent issued in this country on artificial limbs. Palmer forthwith established himself as an American manufacturer. In 1849, he improved the leg and obtained his second patent. In the following year George W. Yerger obtained a third patent issued by the United States Government, and in the same year a patent was issued to W. C. Stone. In 1852 Palmer obtained the fifth patent, and in the same year the sixth patent was granted to J. Russell and the seventh to J. S. Drake, and on March 7, 1854, the eighth patent on artificial limbs was granted to D. B. Marks, referred to on the first page of this book. Yerger, Russell, and Drake never became known outside of the Patent Office. Selpho, Palmer, and Marks were the first to make an impression on the prosthetic industry in America. The works of these inventors have placed America far in advance of all nations in this field of labor, a position which America holds to-day more strongly than ever before, while England has made no practical advance on the Anglesea leg, and France adheres to the productions of Charrier and Mathieu, which are but slight modifications on the works of Verduin, Serre, le petit Lorrain, and Graefe. Germany seems to cherish the historic arm of the German knight and the leg of the Dutch Verduin; but America, ever alert, grasped the situation at an early date, and has since made remarkable strides in attaining the present stage of perfection. From 1846 to 1895 the United States issued 214 letters patent on artificial legs and their attachments, and 35 letters patent on artificial arms; or a total of 249. Of this number the firm of A. A. Marks has been accorded ten distinct and separate letters patent.

From the introduction of the "anglesea" leg, 1800, to the beginning of the Civil War, 1860, very few artificial limbs were manufactured, and progress in the industry was exceedingly slow; but the

War deprived such a vast number of their natural legs and arms that the demand for artificial ones became very large. The United States Government adopted measures at an early date to furnish its maimed soldiers with artificial limbs, and commissioned and authorized chosen manufacturers to supply them at Governments expense. The demand was further augmented by the rapid extension of railroad systems throughout the country; the increase of manufactories that employed ponderous and dangerous machinery; the invention and introduction of agricultural implements, such as mowing machines, reapers, threshing machines; the opening of mines, and the conversion of great forests into timber for building purposes. Although these have been regarded as "implements of civilization," they have had their distressing effect in dismembering the human body.

Surgery has changed; the methods of half a century ago are unlike those of the present day. Toxic germs, the bane of the surgeon, have yielded to antiseptics, and the mortality attending amputations for the removal of diseased and mangled parts has become minimized. Many lives are now saved by modern surgery which in former times would have been lost. All these have served as important causes in creating new fields and enlarging old ones for the prothethist.

CORK LEGS.

The term "cork leg" is a misnomer, a sort of sobriquet for artificial legs in general. The material, cork, has never been used to any considerable extent in the construction of artificial legs. Cork is friable and insufficiently resistant to form any part of the supporting structure. The term has no significance, other than that the leg is artificial. The origin of the term "cork leg" is lost, and nothing in the annals of history or literature discloses any reason why the term should apply. There are, however, doggerels and opprobrious allusions found in the works of satirical authors applied to persons wearing "cork legs," as, for instance, the "Song of the Cork Leg," author unknown:

"I'll tell you a tale now without any flam:
In Holland there dwelt Mynheer Von Clam,
Who every morning said, 'I am
The richest merchant in Rotterdam!'
Ri tu, di nu, di nu, di nu,
Ri tu, di nu, ri tu, di nu, ri na."

"'Mr. Doctor,' says he, when he'd done his work,
'By your sharp knife I lose one fork;
But on two crutches I never will stalk,
For I'll have a beautiful leg of cork.'
Ri tu, di nu," etc.

Thomas Hood, in his Golden Legend, "Miss Kilmansegg and Her Precious Leg," speaks of cork and wooden legs, neither of which was good enough for the fastidious Countess:

"But when it came to fitting the stump
With a proxy limb—then flatly and plump
She spoke in the spirit olden.
She couldn't, she shouldn't, she wouldn't have wood,
Nor a leg of cork if she never stood!
And she swore an oath, or something as good,
The proxy limb should be golden!"

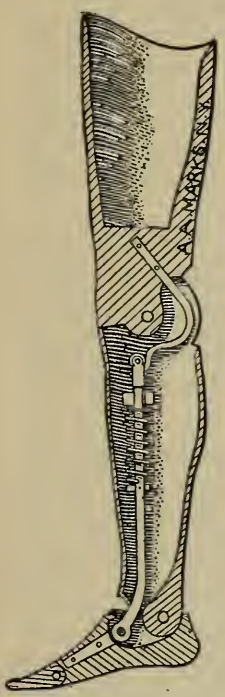
It must be admitted that in our times the term "cork leg" is used very generally and synonymously with "artificial leg."

It is possible that the term "cork leg" had its origin in the fact that in olden times peg legs were sometimes made from a strong piece of wood, cut to proper length to extend from the supporting surface of the member to the ground. This stick was surrounded by cork in order to obtain shape and dimensions approximately the same as the natural leg. Cork would, in this case, be used on account of its lightness, all the superincumbent weight being supported by the wooden stick.

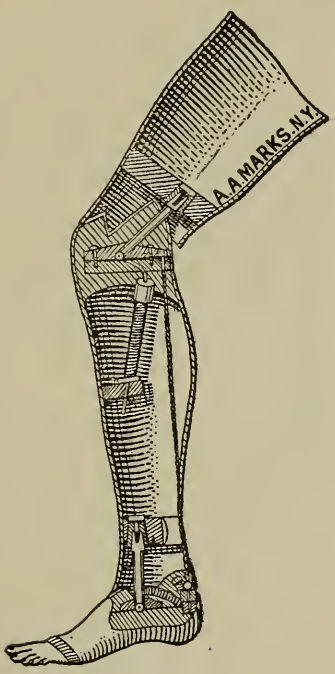
Another explanation, bearing a shade of plausibility for the use of the term "cork leg," may be found in the fact that some years ago artificial legs were made in Cork, Ireland, and the artificial legs made in that city were termed "Cork legs," the same as legs that are made in London are called "London legs," or those that are made in New York are called "New York legs."

EARLY EXPERIENCES.

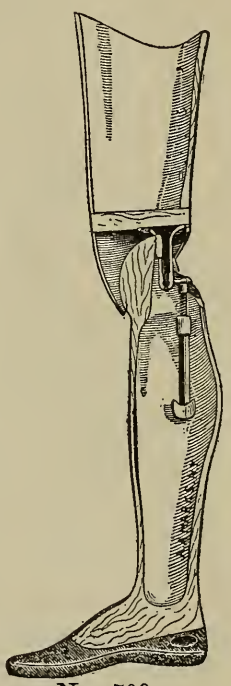
When D. B. and A. A. Marks began the manufacture of artificial limbs in 1853, they met with many difficulties on account of the unlimited range of prosthesis and the very limited resources at their command. They had original ideas, but depended much on experiments to prove the plausibility of those ideas. The productions of their only two competitors were not available, and the advice, conditions, needs, and experiences of the few subjects with whom these neophytes had intercourse formed the only material for their investigations, the only school for their instruction. The thoroughness with which their operations was conducted can only be comprehended by contrasting the industry of those days with the industry of the present times.



No. 507.
MARKS' LEG, 1853.



No. 508.
MARKS' LEG, 1856.



No. 509.
MARKS' LEG, 1896.

The artificial leg manufactured by A. A. Marks in 1853 is represented in sectional cut No. 507. It will be seen that this leg possessed machinery at the knee, ankle, and toe, and movements were obtained by intricate mechanism. The leg manufactured by A. A. Marks in 1856 is represented in cut No. 508. This leg, like the former one, had knee, ankle, and toe movements, but the results were obtained by more practical methods. This leg received the Highest Award at the American Institute Exhibition in 1859. Cut No. 509 represents the last marked improvement in artificial legs. The leg has knee articulation; the

foot is of rubber, by means of which all mechanism, from the calf of the leg down, is dispensed with. This leg is more fully described in the following pages. The leg of 1856 was a marvel in its day. Its knee, ankle, and toe articulations were provided with adjustments that took up all lost motion that came from wear, the range of articulation was adjustable, being capable of changes to suit the wants of the wearer. As an evidence of the esteem with which this leg was regarded by the profession, it is but necessary to refer to the very great compliment that was paid to Mr. Marks in the year 1860, when the Japanese Embassy visited New York.

Kawasaki, of the Embassy, having expressed a desire to visit an American manufacturer of artificial limbs, was conducted to the establishment of Mr. Marks. The following is taken from a New York daily paper:

"The Embassy was escorted to the establishment of Mr. Marks, manufacturer of artificial limbs. The proprietor showed the doctor through his manufactory and explained the mechanism of his apparatus, with which the Oriental visitor appeared very much gratified, stating that nothing of the kind was known in his country. During the interview Mr. Marks took occasion to present the Japanese doctor with one of his most beautiful legs; at the same time expressing the wish that his visitor might never have other occasion for it personally than as one among the pleasant memories of the United States. The gift was accepted with great pleasure and many thanks."

Although indorsed by the most distinguished surgeons of the times and by a considerable clientèle, Mr. Marks was not content with the durability of the leg which he was manufacturing. The improvement and perfection of his limbs were his theme, and how to make the leg stronger, lighter, and more comfortable was the problem that busied him for months and years.

The principal part of the improved leg was made of wood. Sockets had been made of leather, supported by steel straps, and the fittings were made flexible and soft, but failed to prove either comfortable or durable. Every test pointed to the superiority of hard fittings, properly shaped. Adjustable sockets were for a while used for that part of the limb that came in contact with the flesh, similar to the methods still employed in France. Tightening straps and strings were calculated to admit of contraction or distention, to accommodate any change that might take place in the size of the stump; but these devices met with disappointment, and were sooner or later discarded. Tin, woven wire, steel strips, vulcanite rubber, papier maché, celluloid, and wood pulp have, from time to time, been tried, with the hope of finding a more suitable material than wood for sockets. G. W. Yerger obtained a patent from the United States in 1850 for a leg made of steel strips, padded inside to accommodate the stump. O. D. Wilcox obtained a patent from the United States in 1856 for an inner socket leg or a leg with a socket fitted to exactly the shape of the stump, that would occupy a place and be movable within the frame of the leg,—the same idea involved in the modern slip socket,—and, in 1858, the same gentleman obtained a patent for an end-bearing socket, which

has since been purloined by a Philadelphia manufacturer. All these schemes for the substitution of wood for sockets and the structural parts of the leg have been faithfully tried and discarded, not once, but many times. The tests and experiments have brought confirmation of the fact that wooden sockets, fitted to accommodating shapes, are the lightest, healthiest, most durable, most pleasant, and most desirable, and that the elements of strength and lightness are more suitably combined in wood than any other material. It has likewise been proven that adjustable sockets are impracticable; that flexible sockets are painful and unwholesome; that metallic legs are objectionable; that leather legs will foul and become offensive; that rawhide legs will soften, collapse, and decay; that vulcanite legs are friable; that papier maché legs decay and are neither as light nor as durable as wood; and, upon the whole, that willow and linden woods make the best sockets, and are destined to maintain their supremacy for all time to come.

In 1860 Mr. Marks became convinced that the durability of the ankle joint was not as great as it should be. Although it was calculated to withstand the strain of ordinary walking and toiling, yet every now and then some mishap or little thoughtlessness would bring some undue strain on the working parts and cause them to break or become loose. The renewal of the springs and screws, the loosening of the joints, the stretching of cords and tendons, became a source of great annoyance. It will be remembered that in 1860 the curing of rubber by Goodyear had become a practical success, and the material was being adapted to many purposes. The durability and elasticity of rubber, its imperviousness to moisture, and its thousand other excellent qualities made it a welcome commodity to many industries. Mr. Marks bethought himself how he could apply that material to the construction of artificial limbs. He invented the rubber foot and attached it, with ankle articulation, to an artificial leg. The leg worked fairly well, but Mr. Marks was not satisfied that merely the substitution of rubber for wood in the foot would remove the embarrassing complications of the ankle. While he was studying over this matter, an old patron of his called upon him with original plans for an artificial leg. This customer had a long stump, extending almost to the ankle. The extremity of the stump was in a constant state of irritation, and would frequently suppurate; the exudations were of such a nature as to destroy the ankle mechanism in every artificial leg he had ever worn. The foot which this man had planned was to be carved of wood and immovably attached to the leg socket. That this would be feasible was evident to him, as he had tightened up the cords in his ankle joint and blocked the motion so much that he was satisfied he could get along about as well on a leg with a rigid ankle as on one with a moving ankle; and by connecting the foot immovably with the leg socket, he would provide ample room for the extremity of his stump, and would be rid of all the mechanism that so soon became disordered on account of the drippings from his stump. The leg was made according to his plans, and proved to be a success. The man walked surprisingly well and comfortably on the leg, although there was a slight stiffness noticeable in the foot.

About this time, the artificial leg of the French prothetician, Count de Beaufort, was creating some commotion among European manufacturers. The Count de Beaufort leg was nothing more nor less than a cheaply constructed leg, the foot and socket immovably attached, the foot only a semblance to the natural foot, with a rocker sole and not

No. 510.

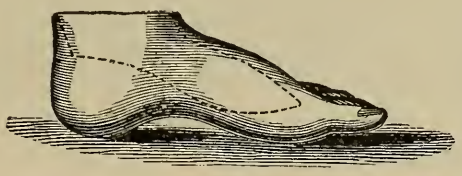
No. 511.

COUNT DE BEAUFORT LEGS.

calculated to be covered by a shoe. The thought struck Mr. Marks that by attaching his rubber foot immovably to the leg socket, he would accomplish three great objects: first, the simplification of the construction of the leg by abandoning ankle-joint mechanism; second, the removal of the stiffness noticeable in the foot which he had made to order for the customer with the long stump, and more or less noticeable in the Count de Beaufort leg, and third, the entire absence of the shock and jar that stumps receive from wooden feet at every step. This was the beginning of the construction of artificial legs with rubber feet. It was the beginning of an era in prosthesis, which the present time can boast of enjoying. This discovery, rather than invention, has brought untold relief and comfort to limb-wearers, and has more completely removed the disabilities of the cripple than any discovery the world has seen.

THE RUBBER FOOT.

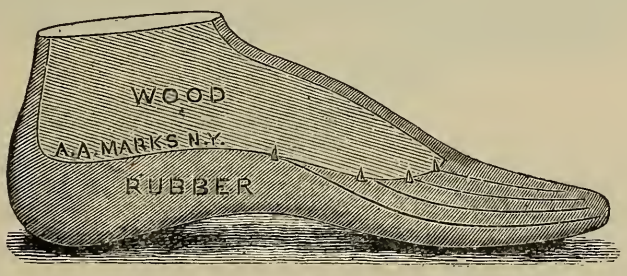
The following cut, No. 512, represents the first rubber foot, invented in 1861 and patented in 1863. The dotted lines in the cut represent the limits of the wooden core, which was placed in the foot for the purpose of localizing the toe movement, affording the proper degree of compressibility at the heel and providing a medium for proper connec-



No. 512.

tion with the leg. The core was entirely surrounded with sponge rubber, with the greater quantity at the heel and toe. The rubber, being sponged, possessed a great degree of compressibility, and would yield under the weight of the wearer; so much so that when the weight was applied at the heel, the compression would be so great as to allow the toe to gracefully reach the ground. At the ball there was less rubber, so as to provide phalangeal support and the wearer be made conscious that there was something in front of his leg that would support him when standing, keep him from limping when walking, and act as a lever for propulsion.

All the virtues of the rubber foot were combined in this model, so far as helpfulness in walking, safety, ease, comfort, and naturalness were concerned, but the foot was not as durable as the improved feet which have been devised since then. Those wearers who bore heavily



No. 513.

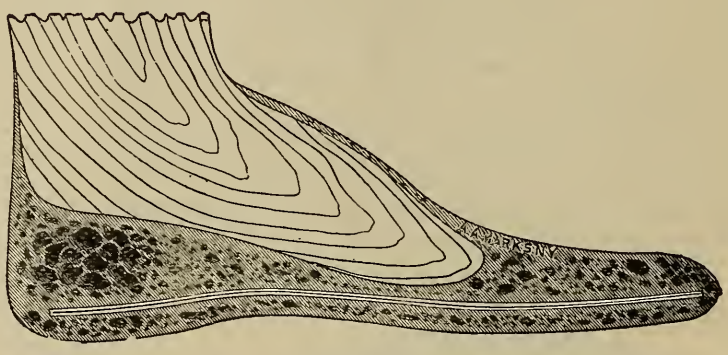
on the toes or were obliged to carry weighty articles, and subjected the front parts of their feet to severe and continuous pressure, would find the toes of their rubber feet becoming set and turned upward. When this was discovered Mr. Marks set about to improve the foot, and succeeded in doing so in an admirable manner. Cut No. 513 represents the rubber foot as improved. In general construction the foot was the same as that which preceded it, differing from it, however, in the fact

that the new foot was fortified at the toes by several layers of canvas which were chemically cemented to layers of rubber and attached to the front part of the block, extending forward to the ends of the toes.

This foot has been properly called the "laminated foot." The presence of the alternating layers of rubber and canvas gave the toes greater life, more resilience, and forced the foot to return to its proper shape with more certainty. Feet constructed on this plan were considered for a number of years very close to perfection. It can readily be seen that the layers of rubber and canvas produced powerful forces that brought the toes back to their former lines and held them there. Every motion of the front part of the foot tended to make these layers travel on each other, and as they were held by elastic media, the forces of the energetic rubber were sufficiently powerful to restore the foot to proper lines. This feature of the rubber foot was patented by the United States, November 16, 1880.

About sixteen thousand feet embodying the laminated toe feature were made and put into active use, many of which have been worn by patrons who resided in every habitable climate under the sun, and the consensus of approval exceeded anything that had been the inventor's most sanguine anticipation.

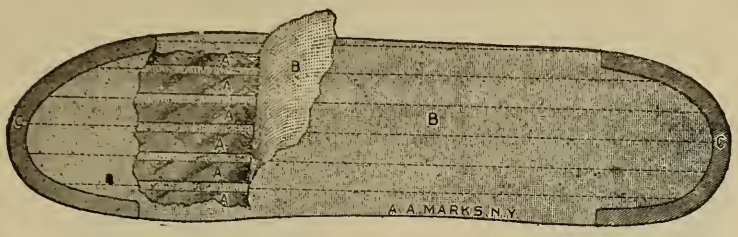
September 17, 1895, the third improvement in the rubber foot was patented by the United States and abroad.



No. 514.

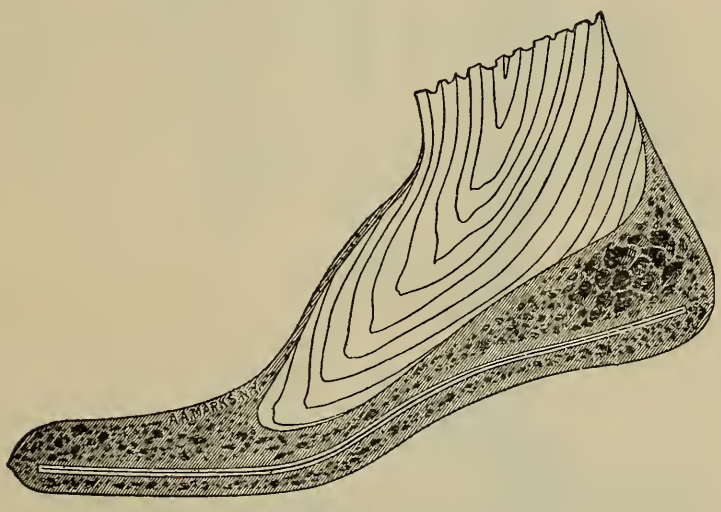
Cut No. 514 represents a sectional view of the new patented rubber foot, which may be described as follows: The body of the foot consists of a wooden core, as in previous models, the core is surrounded with sponge rubber of great porosity; a steel-spring mattress is floated in the rubber, nearer to the bottom of the foot than to the core, and a number of pneumatic air spaces are placed in the heel immediately above the mattress. The steel-spring mattress extending from the heel to the toes, unattached to the core, is composed of a series of spring-tempered steel strips imbedded in canvas, each having a pocket by itself, as represented in Cut 515. The steel strips are represented by letters A, A, A, A, A; the canvas providing pockets for the springs is represented by B, B; C, C, represent metal tips on each end to keep

the springs from creeping. This spring mattress, when floated in the foot, completely surrounded by rubber, provides additional resiliency for both the toes and the heel. Every movement of the foot, when in active use, permits pressure to be applied to the springs at either the heel, ball, or on the sides of the foot, forcing them to act.



No. 515.

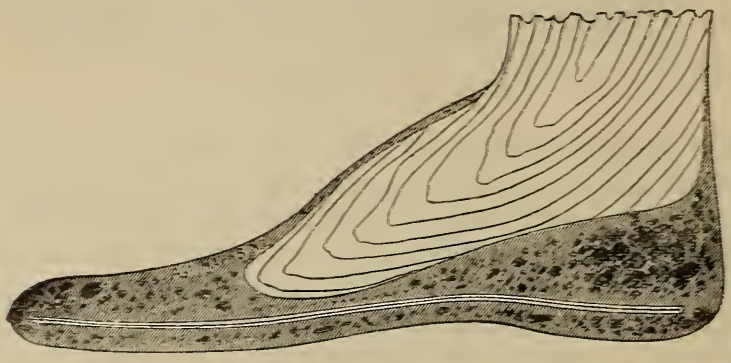
The pneumatic chambers in the heel, between the spring mattress and the core, make the foot at that point more compressible. As the pneumatic chambers are separately surrounded by walls of sponge rubber, there is no danger of the foot collapsing and becoming inert, should the spaces become punctured. The danger of puncture and consequent collapse is a fatal objection to any form of pneumatic foot in which the walls depend, for their shape and resistance, entirely on the pressure of compressed air.



No. 516.

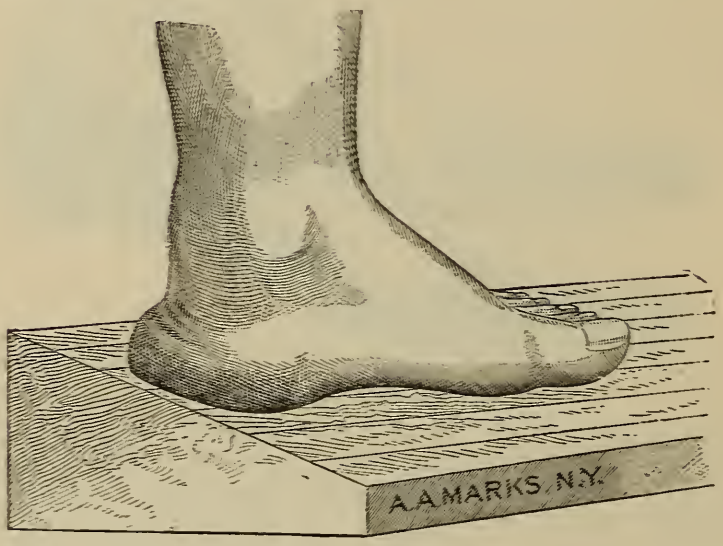
Cut No. 516 represents the new rubber foot with weight applied on the front portion, as it is when the wearer has advanced on the natural foot and is rising on the ball of the artificial foot. It will be seen that, on account of the weight being applied at the ball, the spring mattress is forced upward, and the sponge rubber is compressed above and below the spring mattress. It should also be noticed that this pressure pulls the spring mattress forward in the foot. These forces—first, the yielding of the spring, second, the compressing of the rubber, and third, the pulling of the spring mattress forward—form very powerful resultant forces that bring the

foot back to its normal lines as soon as the wearer has advanced further in the step. The condition of the foot when under heel pressure, when the wearer has placed the artificial limb forward and applied his weight upon it, is somewhat the same, the spring mattress is forced upward; the sponge rubber is compressed above and below the spring mattress; the pneumatic chambers are flattened, and the spring mattress is pulled backward on account of its being deflected from a straight line. The compression of the heel permits the toes and front part of the foot to reach the ground while the shaft of the leg is considerably back of a vertical line.



No. 517.

As soon as the wearer advances so that the weight is vertically over the foot, the weight on the heel is lifted, and the foot resumes its natural shape, as shown in Cut No. 517.



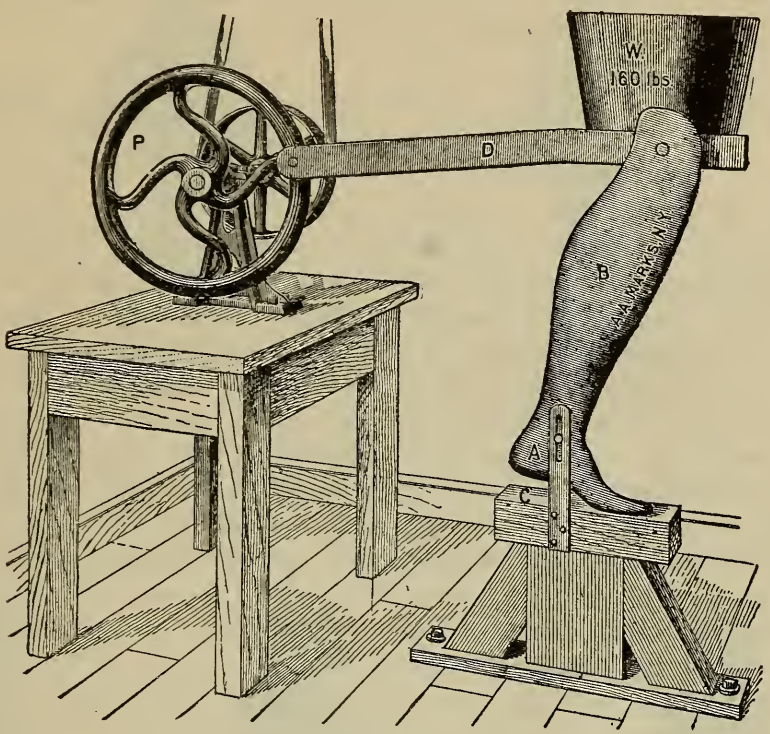
No. 518.

Cut No. 518 represents the foot placed on an inclined surface. On account of the yielding quality of the rubber, the up-hill side of the foot will compress and accommodate itself to the incline and allow the foot to remain on its base. This is accomplished without a complicated mechanical lateral articulation.

The spring mattress not only forces the parts of the foot back to their proper shape, but removes all the exertion that is required to operate the antiquated articulated wooden foot; at the same time the spring mattress re-enforces the front and back parts of the foot.

The future will undoubtedly justify the claims for excellence and durability in this foot.

Before the new patented foot was put into actual practical use, one was subjected to a test that established its durability beyond a doubt.



No. 519.

Cut No. 519 represents the device used for testing the durability and longevity of the foot. A represents the new improved rubber foot; B represents the leg to which the foot is permanently attached; C represents the floor; D represents a lever, operated by power; W represents the weight of 160 pounds, which is considered more than equivalent to the weight of the average laboring man. When power is applied the lever moves horizontally, forcing the leg forward and backward, first with the weight of 160 pounds applied to the ball of the foot and then with the weight of 160 pounds applied to the heel of the foot. This device was put into operation and permitted to run one thousand hours. The length of the stroke was equivalent to the average double step of a man. At the expiration of a thousand hours, calculation showed that the foot had been subjected to the same strain, wear, and service that it would if it had been walked upon by a man weighing 160 pounds, walking three miles a day, continuously for three consecutive years.

The rubber foot and its component parts were still in an unimpaired condition, and capable of undergoing the same test several times over.

The impression that one receives on his first step on this new spring-mattress foot is pleasant and agreeable; especially so if the person has worn an artificial leg that was constructed with a wooden articulating foot.

The action of the rubber foot has always been exceedingly natural, much more so than the flopping of the wooden articulating foot. It can readily be seen that any mechanism in the ankle of a foot that cannot be controlled by the mind or will must be more or less spasmodic, unreal, awkward, and mechanical.

MOTIONS OF THE NATURAL FOOT AND ANKLE WHEN WALKING.

That the movements of the rubber foot more closely approximate those of the natural foot in walking or running than the movements of the mechanical ankle joint can be ascertained by resort to instantaneous photography. Photography discloses the fact that, when walking and running, the range of motion in the natural ankle joint is extremely limited, and that the faster the man walks, the more abbreviated is the range of motion, and that when the man is running, the ankle articulation is reduced to rigidity. The runner practically springs from the ball of one foot to the ball of the other. At all times, the natural movement in the natural foot is under absolute control of the intellect. The degree of tension given to the flexors and extensors is always governed by the speed with which the man moves and the conditions of the surface on which he is traveling. The eye telegraphs to the mind the peculiarities and conditions under which the foot should operate, the mind responds by commanding certain tendons and muscles to operate so that the proper resistance and stability, and the proper degree of mobility, will be accorded; thus the man walks gracefully and with safety. If the co-ordination that exists between mind and muscle be destroyed, or in the least becomes impaired, the man becomes a paralytic, and it is absolutely impossible for him to walk with safety. A man with an artificial leg with mechanical ankle joint can be compared with the paralytic. Every time he places his foot on the ground he does so with fear and uncertainty, because there is no intellectual control over the movements of the foot. A pebble or an uneven surface will throw him off his equilibrium. With the rubber foot, which yields at the toe and heel, his movements are safe and sure, and the elastic media of rubber and springs gives the foot an apparent motion that destroys all stiffness or awkwardness.

Watch a man walking on his natural feet at an easy gait. As he throws his left foot forward to take an advance step, he elevates on the ball of his right foot as shown in cut No. 520. He barely touches the heel of his left foot to the ground, when he gives his body an impetus with the ball of the right foot; see Fig. 521. The ball of the left foot does not reach the ground until the propulsion given by the right foot

has carried the body nearly vertically over the left foot; see Fig. 522. At this point, the right foot, having risen from the ground, is in the act of passing the left; it being carried well in advance of the left, the heel is placed to the ground at the moment the left is well raised on the ball; see Fig. 523, and the right foot rests flat on the ground when the left is elevated, and about to pass the right; see Fig. 524. This is repeated as the walking continues.

No. 520.

No. 521.

It should be observed that, during those movements, the plantar surface of the natural foot is on the ground but a short interval, and only at such times as the body is nearly and directly over that foot. The cuts used to illustrate these five positions have been carefully pre-

No. 522.

No. 523.

No. 524.

pared from instantaneous photographs taken of a man with natural feet, walking at a moderately rapid speed. They reveal very curious positions of the legs and feet, and do not appear very graceful or natural, but they are nevertheless true, and present striking illustrations of the principles involved in the rubber foot. They show that with natural feet there are times during the process of walking when the heel only is on the ground, and times when the toes only are on the ground, and that the plantar surface of the advanced foot does not reach the

ground until the body is nearly or directly over it, nor does the plantar surface remain on the ground for more than a brief interval, as almost the very moment the body passes a vertical line, the tendo-Achillis is contracted and the body rises on the ball of the foot and the heel rises from the ground. It will be well for the investigating mind to carefully study these pictures and note the peculiar position in which the feet are placed at the various stages of the step.

Now, imagine that one of the legs is artificial, with a moving ankle joint that will admit of the plantar surface of the foot being flat on the ground from the moment the heel touches to the moment the toe rises. Photographs taken of a foot constructed in that manner, at the various intervals during the step, will show a marked contrast to the pictures above. A person wearing an artificial leg with an articulating foot will walk somewhat in the following manner: advancing on his artificial leg, he strikes the heel to the ground, and the moment he applies weight to that leg, the toes immediately drop with a thud and the plantar surface of the foot remains on the ground during the entire interval that the body is passing over the foot, and when the body has passed forward of the foot, the heel still remains on the ground, and the wearer has to use supreme effort in order to spring from that foot, as he receives no assistance from the ball. This exertion is not only an additional tax, but produces an awkwardness and limp that are conspicuous and make the fact apparent that an artificial leg is being worn.

Some makers of the ankle-joint leg claim that they remedy this difficulty by tightening the heel cords, thus making the ankle joint practically rigid; but no means have ever yet been devised that will admit of tightening the heel cord and keeping it so permanently. The heel cord, under the enormous strain, will invariably stretch or break. When the heel cord is tightened, the conditions are unquestionably improved, and the foot assumes the action and operation of a rigidly attached foot. Now, if the conditions are improved by having the ankle motion limited by the tightening of the heel cord, why is it not an advantage to attach the foot permanently; depending on the elasticity of rubber in the foot to avoid concussion, and thus dispense with a mass of heavy, complicated, unreliable, treacherous, and needless machinery ?

Having made plain the movements of the natural foot in walking, and having contrasted the movements of the mechanical foot, let us study for a moment the movements and action of a sponge rubber foot attached to the leg socket, without ankle articulation. The wearer advances on the rubber foot, he touches the heel of the rubber foot to the ground, and, as he applies his weight to that side, the sponge rubber in the heel compresses sufficiently to allow the advance on the ball of the foot to be made smoothly and gracefully. He rolls on the ball of the foot without any effort whatever, receiving a great amount of assistance from the rocker bottom of the wooden core inside of the rubber foot and the steel-spring mattress floated in the foot. The moment the heel is relieved of weight, the elasticity of the rubber and

the resiliency of the spring mattress force the rubber heel back to its proper shape. The toes bend at the proper place, and the wearer completes the step without effort or a perceptible limp.

A comparison of the two methods, with and without ankle joints, in artificial legs, shows that with the artificial ankle joint the interval that the plantar surface rests on the ground is very much greater than that of the natural foot, while with the rubber feet the interval is approximately the same, or a trifle less; thus, by means of the rubber foot, a more natural action is obtained and a vast amount of mechanism dispensed with.

It is impossible to overestimate the value of mental forces in controlling the actions of the natural ankle joint, and when these mental forces become inert, as they necessarily must in artificial joints, the embarrassments that follow are very great, as in locomotor ataxia, in which the afflicted walk by placing their feet almost entirely by the sense of sight. It is easy for a person to appreciate the merits possessed in the immovably attached foot when comparisons, as above, are indulged in.

It is the experienced man, the man who has experimented with both kinds of limbs, who appreciates the principles involved in the rubber-foot discovery. It is the experienced man who comprehends the reason why the wearers of artificial limbs with rubber feet walk farther, faster, and with less fatigue, than those walking on ankle-jointed wooden feet.

In running the contrast is still more striking; for, with either the rubber or natural foot, the entire plantar surface is never on the ground. It is the heel-and-toe touch to the ground that distinguishes the fast walker from the runner. Running is the act of springing from the ball of one foot to the ball of the other. With the ankle-jointed foot, running is exceedingly awkward and unnatural. The movement in the ankle impedes celerity. When standing, the immovably attached rubber foot furnishes a large base on which to balance; hence, a man with two artificial legs with immovably attached feet can stand restfully and safely without assuming awkward and unnatural positions.

The rubber foot affords the laborer a substantial substitute with which to support and brace himself when working at the bench, or on the road, on the farm, or at whatever occupation he may be engaged in. There are no uncertain or treacherous movements to hamper him or make his position uncertain; his support is adequate and positive.

One of the patrons of the rubber foot, a painter by occupation, claims that with the rubber foot he can climb a ladder, stand on a scaffold and balance himself at any elevation with absolute safety. With an ankle-joint leg he would feel tottlish, and, when on a ladder, would have to depend more on the grasp of one hand than on his foot; but, with the rubber foot, his base is substantial and reliable.

A farmer who toils in the field can plod along over stony or muddy ground on a rubber foot with safety. The accumulation of mud on his shoes does not cause his toes to drop and trip him. Uneven surfaces will not throw him from his balance or produce violent jerks to his stump.

THE COST OF WEARING.

The greater number of artificial-limb wearers are poor persons. It is an exception to find a wealthy or even a well-to-do man in need of an artificial limb. It is the poor man, the wage-earner, the laborer, the man that works in the mill, the engineer, fireman, or brakeman on the railroad, the miner working in the gangways and breastworks, and the privates in the army, whose occupations place them in jeopardy, and who are exposed to the dangers which destroy life or mutilate the body. This being a fact, it is all the more important that artificial limbs should be made that are absolutely durable and inexpensive to wear. The first cost, that of purchasing the limb, should be the only important item that the wearer should provide for. An artificial leg or arm that is constructed with delicate machinery or parts subject to friction is not objectionable for a showcase, but is ill-suited to the wants of the man who has to support himself and family by daily toil. The loss of time in having repairs made, the cost of repairs, and the dangers of breaking down at critical times are serious matters, and the careful man should take these matters into consideration before he decides what make of limb to buy. We do not know of an artificial leg with an ankle joint that is now made or that ever has been made, and we doubt that there ever will be one made, that will not cost from five dollars to twenty-five dollars a year to keep in repair. The delicacy with which an ankle joint must be constructed in order to be light, and the immense strain that the ankle must resist when the leg is subjected to severe strains, are conditions that are antagonizing to durable ankle mechanism. The experience of an old patron with an ankle joint, as told in previous publications, is worthy of repetition here, as it but repeats the experience of thousands of wearers of artificial limbs with articulating feet.

"I started from my house one morning to meet a pressing engagement. I had not gone far, when the ankle-joint of my leg became noisy, and squeaked. My first impulse was to disregard it, but the noise increased, and I was fearful that I might attract attention, so I entered a drug store, where I had a passing acquaintance, and asked the proprietor to admit me to his prescription room, and furnish me with some oil and a screw-driver. It took about one hour to disjoint the foot, lubricate the working parts, and reconnect them. I resumed my journey and got but a short distance, when I made a false step on the toes of my artificial foot and broke the heel cord. This, of course, occurred at a moment when I was bearing heavily on the toes, and the breaking of the heel cord allowed the leg to pass so far forward that the lower part of the leg became very badly splintered. Of course, I was helpless in this condition. I hailed a carriage, and with the assistance of a passer-by, I succeeded in hobbling to and getting in the vehicle. The thoroughfare at which this happened was a thickly traveled one, and the collection of persons, who looked upon me piteously,

added much to my embarrassment. Instead of pushing on to meet my engagement I dispatched a message of explanation, and directed the driver to take me to my home. There I was obliged to remain three long days until my artificial leg could be repaired and returned to me."

The recurrence of incidents of this kind is certainly enough to distract anyone, and to force any conscientious manufacturer into the adoption of more simple and durable methods of construction. The absence of ankle mechanism removes the possibility of the foot becoming loose, disjointed, or in any way treacherous.

The fact that persons walk, run, and perform all kinds of labor on artificial legs with rubber feet immovably attached, is certainly evidence that the ankle mechanism is entirely useless. Men, women, and children with rubber feet run, walk, skate, dance. Performances, regarded not many years ago as impossible, are daily being performed with facility. The farmer follows his plow on a rubber foot, the blacksmith works at his forge on a rubber foot, the sailor climbs the rigging, the builder erects houses, and persons of every vocation attend to their affairs with little concern and hindrance; accomplishing as much labor, earning as much wages, and living as happy lives as others of their associates who are in possession of all their natural limbs.

WEIGHT, ODOR, AND THE EFFECTS OF TEMPERATURE ON RUBBER FEET.

Some of our competitors, more unscrupulous than truthful, have circulated the report that artificial legs with rubber feet are heavier than those with wooden feet; that rubber emits a disagreeable odor, and that, on account of changes in the weather, the rubber becomes hard and crumbles, and a thousand other equally absurd criticisms. All these statements are made without fact or foundation. They are only calculated to bias the mind capable of being influenced, and to divert attention from the merits of the rubber foot—in short, a business ruse, a trick, a deceit. In the first place, artificial legs with rubber feet are lighter than artificial legs with wooden articulating feet. The absence of metal parts, such as springs, joints, and cords, removes the greatest bulk of weight, therefore, artificial legs with rubber feet without these metallic parts can be lighter than artificial legs with wooden feet and metallic parts. The sponge rubber used in feet that are made at the present time is not as heavy as wood, therefore, the substitution of rubber for wood causes an additional reduction in weight.

We have removed wooden articulating feet from artificial limbs in hundreds of cases and substituted them with rubber feet. In every instance of which we have a record, the weight of the leg has been diminished from one to eight ounces, and this reduction of weight has been made at the extremity of the leg, where it is mostly felt.

The second statement is equally false, that there is a disagreeable odor that emanates from the rubber foot. That this is false is apparent, as sponge rubber is as odorless as wood; besides the rubber foot is covered with air-and-water-tight material and surfaced with a waterproof enamel. Should the rubber possess any disagreeable odor, it would not be possible for that odor to escape.

On the other hand the ankle joints of articulating feet have to be oiled very frequently, the oil in time becomes rancid, and the odor of rancid oil cannot be tolerated by one of refined senses.

The third statement can also be contradicted, as pure gum, properly vulcanized, will neither deteriorate nor undergo any change in its consistency or elasticity, by any changes of temperature that the human body is capable of surviving. It requires 280° Fahrenheit of temperature to produce any change in rubber, and as there is no habitable place on the face of the earth with a temperature very much above 100°, the foot is never placed in danger on account of heat, as no human being could live in a temperature intense enough to affect rubber.

THE WEIGHT OF AN ARTIFICIAL LEG.

The weight of an artificial leg may be said to vary from one pound to seven pounds, according to the amount of material required to make it of proper size and of sufficient strength to meet the needs of the wearer. We have applied artificial legs to children less than one year old. The artificial legs applied would not weigh over a pound, but modern Goliaths who weigh from two hundred to three hundred pounds, and engage in heavy, laborious occupations, must have artificial limbs that will weigh from six to seven pounds, in order to have requisite strength. The only way to obtain strength is by the employment and proper disposition of suitable material, therefore a small leg is not as heavy as a large one, and a strong leg must be heavier than a weak one. A leg with a rubber foot can be made from six to sixteen ounces lighter than any other kind, on account of the absence of heavy, metallic ankle machinery.

The ideas of those wearing artificial legs, in regard to weight, cannot be taken as a criterion. Some say, "Make my leg as light as possible, even if you have to sacrifice strength." Others say, "Do not make my leg too light; I have worn light and heavy legs, and I find that I can walk more steadily and step more naturally with a leg of moderate weight than with one extremely light. I like to have my leg act as a pendulum, so that when I raise it from the ground, after taking a step, the weight of the leg will be sufficient to cause it to swing forward and ahead of the center of my body, without requiring assistance from my stump." Others say, "I do not care what the leg weighs, as long as it is made strong; strength is the greatest consideration. If the leg weighs a pound or two more I will not object to it, as I can soon get used to that, but the leg must be strong and last a long time, as I am

poor and cannot afford to take chances on the leg breaking or wearing out." It will thus be seen that the opinions of wearers are at variance and cannot be depended on.

We must confess that the demand of the vast numbers of those wanting artificial limbs is for the lightest leg that can be produced, even at the sacrifice of strength and durability. For such persons legs are made extremely light, with the smallest possible margin of safety. For light, delicate ladies weighing less than one hundred pounds, a full-length leg weighing three pounds, without attachments, is as light as it is possible to produce. A leg made as light as that, and having sufficient strength, is almost a marvel. We know of nothing produced in mechanism calculated to withstand the same strain that has so little weight; a leg weighing six pounds for a large, heavy person, one who is likely to subject the leg to severe use, is not excessive, and should not be complained of. Let us think for a moment of the weight of other instruments that are not calculated to withstand greater or severer strains. The bicycle has had its weight reduced from sixty pounds to nineteen, and it is generally conceded that a nineteen-pound bicycle is as light as prudence will allow, and persons marvel at a bicycle weighing so little; yet the nineteen-pound bicycle has no more work to perform, is not subjected to any more strains than an artificial leg weighing from three to six pounds. The bicycle, as well as the leg, has only to support the superincumbent weight of the rider and resist such strains as they are occasionally subjected to. We have known women to complain about the weight of an artificial leg that actually weighed less than four pounds who would not groan under the weight of an eight- or ten-pound gown. We have actually seen women with gold and silver smelling bottles, lorgnettes, chatelaines, bangles, and trinkets suspended from their slight waists and suffer no inconvenience from the burden, and at the same time express a wish that their three-and-a-half-pound artificial leg might be made lighter.

The maker of an artificial leg must construct a leg that will not only sustain the weight of the wearer, but that will not break under such strains as the leg is likely to receive from time to time. If a person slips and recovers himself with his artificial leg, some part of that leg receives a strain that is much greater than the weight of the wearer. A person ascending or descending stairs subjects his artificial limb to greater strains than he does when he is walking on a level. The leg must be made strong enough to meet these demands, and besides that must have a margin of strength that will enable the wearer to carry such articles and lift such weights as his vocation or necessity may require. No matter how crippled a person may be, and no matter what station in life a person may occupy, and no matter how delicate the person may be, there are times when that person will find it necessary to lift, carry, push, or pull some weighty object, and subject his artificial leg to more strain than merely walking upon it.

It is not wise to build an artificial leg so close to the danger line (especially when made for a delicate person) that when that person becomes well, stronger, and heavier, the leg will crush. Conditions

do not always remain the same. "The weak of to-day are the strong of to-morrow." The light person frequently becomes heavy, and the wise limb-maker will keep on the safe side; otherwise he will place his reputation in jeopardy.

The average weight of a substantial artificial leg suitable for a thigh amputation, to be worn by a man of average size and weight, engaged in an ordinary occupation and possessing the requisite strength, may be placed at five pounds, and less when for a leg or foot amputation. The location of the weight of a leg has much to do with the apparent weight; thus, a leg weighing six pounds can be so constructed as to feel lighter than one weighing half as much. Flimsy, insecure, and inadequate means of attachment to the body will make the leg feel much heavier than it really is. A heavy foot with a light thighpiece produces an apparently heavy leg, because the foot is distant from the stump and is weighty, and the thighpiece is light, flimsy, and does not hold the leg to the stump securely. On the other hand, a leg with a light foot and a strong, substantial thighpiece, which properly secures the leg and holds it in place, reduces its apparent weight considerably.

HOW LONG WILL AN ARTIFICIAL LEG LAST?

The question is frequently asked, "How long will an artificial leg last?" Our reply is invariably, "That depends upon the care that is given to it." We have patrons who are still wearing artificial legs that were made for them over twenty-five years ago, and the legs appear to be in fair condition at the present time, but these are exceptional cases and should not be held up as a criterion any more than should the experience of some who, through abuse and carelessness, destroy their artificial limbs in unexpectedly short times. An average made of the frequency with which our patrons renew their substitutes, fixes the period at about eight years. This does not imply that a leg will not last longer than eight years. Renewals are often made not from necessity but from choice; the wearers want new legs the same as they want new coats, before the old coats are completely gone. Artificial limb-wearers become as proud of their artificial limbs as they do of any article of apparel, and those of abundant means frequently supply themselves with several, so as always to have one in reserve to meet an emergency. Accidents are as likely to occur to artificial limbs as they are to natural limbs. Men have fallen under vehicles and have been fortunate enough to have their artificial legs crushed instead of their natural ones. When accidents occur to artificial legs, they are removed from the body and sent to the manufacturer for repairs. The wearer who is fortunate enough to have a duplicate artificial leg is certainly at great advantage. Taking all these facts into consideration, and fixing the average life of an artificial leg at eight years, is certainly placing the estimate within the limit.

The United States Government, with great liberality, has fixed the periods for issuing of artificial limbs to pensioners at three years. This is done wholly as a gratuity, not as a necessity.

STOCKINGS AND SHOES.

All artificial feet should be dressed with stockings and shoes, the same as natural feet. The wear and tear on shoes and stockings, when the feet articulate at the ankles, are enormous, and have been a source of complaint by many wearers. This annoyance is entirely removed by the use of rubber feet; besides that, shoes on rubber feet always look like shoes worn on natural feet, as the wrinkling at the toes and other parts is the same. We have heard patrons say that in five years their rubber feet have saved them in the cost of stockings and shoes a sum of money nearly sufficient to buy a new leg.

FITTINGS.

Ease and comfort in wearing an artificial leg or arm can only be obtained by means of proper fittings—no matter how well the limb may be constructed, or with what nicety all the parts operate, the limb is worthless if it causes pain to the wearer, chafes the stump, or excites irritation. The art of fitting an artificial limb is something that cannot be obtained by any mechanical methods. A thorough knowledge of the anatomy of the stump, the causes and effects of pressure here and there, the importance of non-interference with the circulation, and how to provide a fitting that is comfortable and that will not interfere with circulation or displace the tissues on the stump, is something that can only be acquired by experience, judgment, thoughtfulness, and conscientious study.

There are a great many artificial-limb manufacturers in the world, but there are very few fitters. Limbs that look very nice in show cases may please the eye, but limbs that are skillfully fitted are the only ones that will please those who are to wear them.

Every conscientious manufacturer knows that there is but one way in which to fit a limb, and that is to excavate a block of wood until the excavation is of proper size and shape to receive the stump comfortably without compressing the blood vessels or drawing the tissues over the extremities. A properly fitting socket is entirely different in shape to the stump which it is calculated to accommodate—a plaster cast of a stump and a plaster cast of the inside of the socket that fits that stump are no more alike than the last on which a shoe is built is like the foot on which that shoe is to be worn. The inside of a socket is provided with channels for the accommodation and protection of exposed bones, and provided with hollows for the accommodation of sensitive prominences. These channels and hollows are accentuations of the parts of the stump that are delicate and that will not

admit of pressure. It is absurd to assume that if a cast is made of the stump and any plastic material, such as leather, felt, rubber or metal is formed on that cast, that a comfortably fitting socket will be obtained. Sockets made that way are always irritating, and a source of much pain and suffering. Even the cutting out of a block of wood to the counterpart of a plaster cast of a stump, is productive of unsatisfactory results. It is the novitious artificial limb-maker who blunders into errors of this kind, and it is the brainless wearer of artificial limbs who permits himself to become beguiled into this way of obtaining a fitting. If a plaster cast of a stump could be depended upon as a safe guide, the process of fitting artificial limbs would become greatly simplified, and instead of employing high-priced fitters, the work could be done by inexpensive apprentices, who would have only to place plastic material on a form, or to attend and feed a fitting machine.

There are irregular-form turning lathes, as all mechanics know, that are capable of carving out a block of wood so that the interior of the block will have the exact form of a model which is placed in the lathe. We have seen these machines in operation, and would hail with delight the opportunity to use them in our work, if plaster casts or molds could be used for models. By such means the matter of fitting would be reduced to a mechanical process, as the machine would automatically follow the model and excavate the block of wood accordingly; but, unfortunately, a plaster cast is not a safe guide, and, when used, it must undergo some alterations which none but the skilled fitter is competent to make. The same skill and labor and judgment necessary to modify the cast can be applied to the excavating of the block directly, and the same results will follow, with less labor and more certainty.

When we consider that the composition of the stump is but bone covered with muscles, fat, blood vessels, nerves, tendons, and skin, and that these components are not uniformly distributed over the bone, and that they are soft, yielding, and easily displaced, and further, that where the nerves are less sensitive more pressure can be applied, and where they are closer to the surface and more sensitive less pressure can be applied, we will readily see that a socket made to fit that stump properly must permit pressure to be applied, not generally or uniformly, but only on parts of the stump that will endure pressure without producing pain. We will also see that the vascular parts of the stump must be subjected to no pressure whatever; for, if the veins are constricted, the stump will become strangulated, and if the arteries are constricted the stump will be insufficiently nourished. For these reasons it is obvious that artificial legs should be fitted only by persons skilled in the work, who know the location of large blood vessels, the character and disposition of the nerves, and who attach importance to the necessity of avoiding pressure on the vascular parts. A man who has this knowledge and judgment is competent to fit an artificial leg, and he is the only one who should be intrusted with such delicate work. The skilled fitter does not always need the presence of the person who is to wear the leg he is fitting. Circumferences and diagrams of the

stump are sufficient guides for him. With these data, he can do more for the comfort of the wearer who lives at a distance and cannot leave his home than it is possible for incompetent fitters to do with plaster casts, or even with the presence of the wearer.

We do not wish to be understood as discrediting plaster casts. Casts are useful in some cases and are useless in others. Carefully made casts will of course convey the contours of the limb and will locate irregularities, prominences, and tender spots. Plaster casts are always necessary when persons are to have artificial limbs fitted in their absence, who have stumps that extend to the knee joint or ankle joint, or a partial foot stump or elbow joint, wrist joint, or partial hand stump; but, generally speaking, stumps that extend to any point between the articulations do not require to be reproduced in plaster.

The advantages of wood sockets can be more fully appreciated when the facts above presented are understood. A wood socket always retains the shape that it receives from the skillful fitter. No matter what may be the condition of the weather or the condition of the stump, the socket is always the same. A leather or padded socket, or any socket that is soft and yielding, will lose its character from wear, soften from the heat and moisture of the stump, and will change in shape from a socket that protects tender spots to one that will possess the exact shape of the stump, and that will apply pressure uniformly about the stump, or, in other words, that will press tender and sensitive spots equally as severely, as the places that are capable of enduring pressure. These disadvantages of leather, or pliable material of any kind, are thus made apparent.

CHANGES THAT TAKE PLACE IN A STUMP AFTER A LIMB HAS BEEN APPLIED.

It is absolutely impossible for a limb manufacturer to anticipate and provide for changes that the wearing of an artificial leg may produce in a stump. He may look for some general change, but it is conjectural, and he cannot provide for them.

We have a great many patrons whose stumps have never changed from the moment they applied their artificial limbs years ago. We also have patrons whose stumps have grown larger, and we have many patrons whose stumps have emaciated and become very much smaller. Much depends upon the disposition of the person, his occupation, and habits. Generally speaking, there is a tendency for stumps to become smaller, on account of the pressure due to the wearing of artificial limbs and the activity that artificial limbs force upon the stumps. When stumps reduce, artificial limbs fail to fit snugly, and it is necessary to put some form of lining in the sockets of the limbs or wear a great number of coverings on the stumps. In cases of great shrinkage,—so great that the wearing of many coverings on stumps or fillings in the sockets produce discomfort,—the best remedy is to have the sockets removed from the legs and new ones put on.

In order to minimize these possible changes, it is always well to bandage the stump tightly, and keep it bandaged, from the time the stump is healed until an artificial limb is applied. While bandages may or may not reduce the size of the stump, they will keep it from becoming swollen or edematose. We cannot promise that all the changes that may take place in a stump can be brought about by bandages. If the stump is one that will yield and become smaller under bandages, it is very likely to yield and become still smaller under the pressure of an artificial limb.

Sometimes the question is asked, "Is it not a good plan to bandage a stump tightly, and reduce it as much as possible, before applying an artificial limb?" We always reply to this question in the affirmative, and urge the use of bandages for a few days as an experiment. If it is found that the bandages produce any reduction in size, then continue the use of bandages until the reduction ceases. If no apparent changes are brought about by two days' bandaging, it is safe to consider that bandaging is useless, and an artificial leg can be applied immediately.

It is not always comfortable to bandage a stump. It is hard to keep bandages on short, flabby stumps, and the attention required to take them off and tighten them and put them on very frequently, is considerable. After considering the matter in all its lights, we are thrown in doubt as to whether it is economy to postpone the application of an artificial limb for weeks or months, with the hope of bringing about a reduction in size, in order to save the trifling expense of a new fitting. As the expense of a new fitting is very small, will it not be more economical in the end, and will it not contribute more to the comfort and happiness of the patient, if an artificial limb is applied to his stump as soon as it is healed, and the patient has regained enough strength to get about on crutches? By this means he will learn to walk at an early date, will be able to dispense with the use of his crutches, will have his stump thoroughly protected from injury, will be able to go about and take healthful exercise and attend to such duties as his occupation may demand; then, if at the end of a few months his stump has shrunken, and it is deemed advisable to provide a new fitting, let him pay the small amount and have a new socket applied to the limb. It certainly seems to us that the use of an artificial limb for the length of time that it takes to reduce the stump, the healthful exercise that the wearer will obtain, and the time that he will be able to give his occupation will more than offset the cost of a new socket. A new fitting may be considered as the final one, and will answer for many years.

REQUIREMENTS.

The requirements of an artificial leg which are most essential are as follows: First, fittings and adjustments that do not abrade, strangulate, wrench, or twist the stump; second, articulations that approximate nature, that aid propulsion, that are noiseless, durable, safe, and

not superfluous; third, minimum weight and maximum strength; fourth, naturalness in appearance; fifth, durability.

Not one of these requirements can be sacrificed with prudence. Each requirement is fully discussed in the pages of this book.

We claim to have combined all of these requirements in the most scientific manner.

The substitution of the India rubber foot for the wooden foot has simplified the construction of the leg, and has made it possible to discard much intricate, heavy, noisy mechanism. The value of this substitution cannot be overestimated. A soft, yielding medium to stand, walk, or run upon, must be admitted as superior to the heavy, harsh, mechanical foot which jars the stump and exasperates the wearer.

RUBBER FEET WITH ANKLE JOINTS.

Although we have the strongest preference for artificial legs with rubber feet permanently attached, and feel that our experience, observation, and study sustain us in our opinion, we do not permit ourselves to stand in the way of applicants having artificial legs constructed upon plans that are more to their choice.

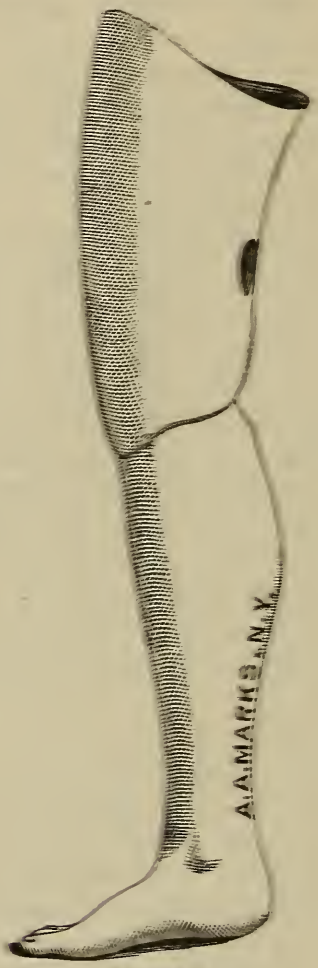
We frequently hear that So-and-so would buy of us if we would furnish rubber feet with articulating ankles. The idea of the rubber foot is acceptable, but rigidity at the ankle is doubtful. We know that there are persons who have become inured to articulating feet, and who do not care to change to artificial legs with "stiff ankles"; that the element of doubt frequently hinders them from trying rubber feet. Although they are willing to assent to the fact that the advantages of rubber over wood are many, they do not care to take chances on rigid ankles. We are disposed to accommodate persons who have fixed preferences, and will make for them artificial legs with rubber feet that articulate at the ankles, when so ordered.

A rubber foot articulating at the ankle is far superior to a wooden foot articulating at the ankle; and while we consider that a non-articulating foot is the best of all, we will not obtrude our opinion or choice beyond the reasonable limit.

If, therefore, a customer desires to have his artificial leg constructed with rubber foot articulating at the ankle, we will construct a leg that way for him, upon his request. Prices are the same, whether rubber feet are permanently attached or made to articulate. We will do more than this: in order to relieve the patient of all risks, we will make an artificial leg with rubber foot permanently attached, and if within one month the wearer feels convinced that he would prefer an articulating foot, we will change the leg so that the foot will articulate, and will make no additional charge for making that change.

DESCRIPTIONS OF ARTIFICIAL LEGS SUITABLE FOR THIGH STUMPS.

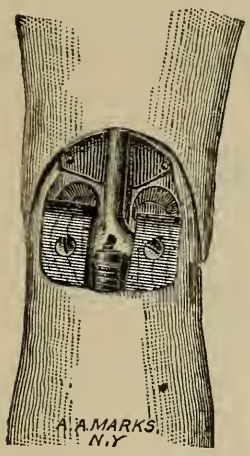
The structural parts of an artificial leg suitable for a thigh stump may be described as follows: The thigh and leg sections are made of tough and light willow or basswood. They are shaped to approximately the size and contours of the companion or natural leg. The thigh section is excavated to proper shape and size to accommodate the stump, permitting pressure to be applied only at admissible places—about the sides of the stump, distant from the extremity, and about the ischial and perineal regions. The lower section of the leg is excavated in order to reduce weight, the upper and lower sections are connected by an articulating joint, which is capable of adjustment as hereinafter described. The lower section is permanently attached to the rubber



No. 535.

foot. The upper and lower sections are covered with raw hide in order to obtain strength, the foot is covered with flexible calfskin, the entire leg is enameled with a flesh-tinted preparation that not only ornaments the leg but makes its surface waterproof.

Cut No. 525 represents the usual form of an artificial leg for a thigh stump. This leg is held to the stump by means of suspenders which pass over the shoulders or about the body. Suspenders are described



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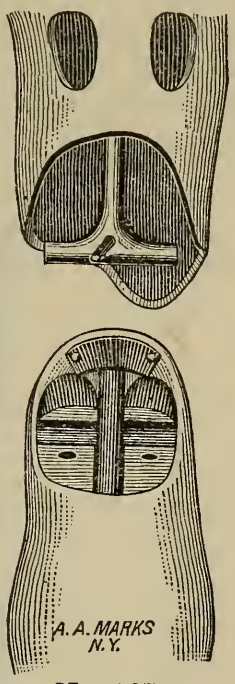

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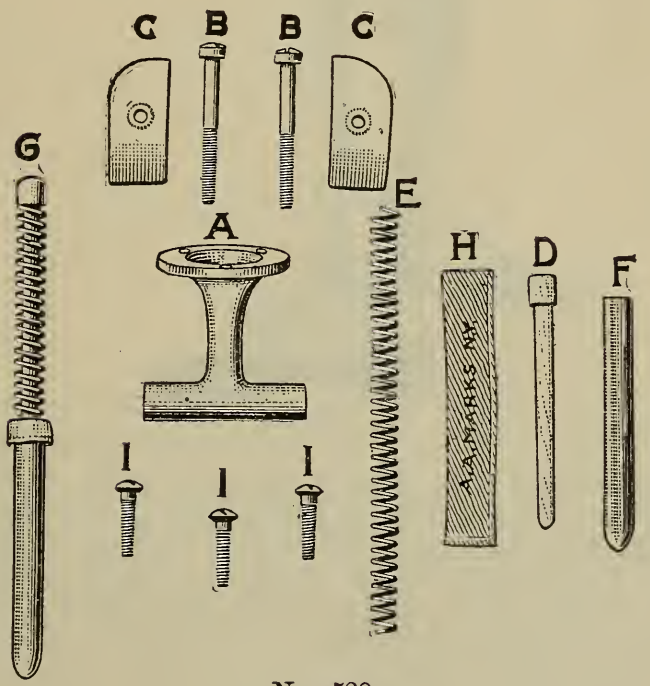
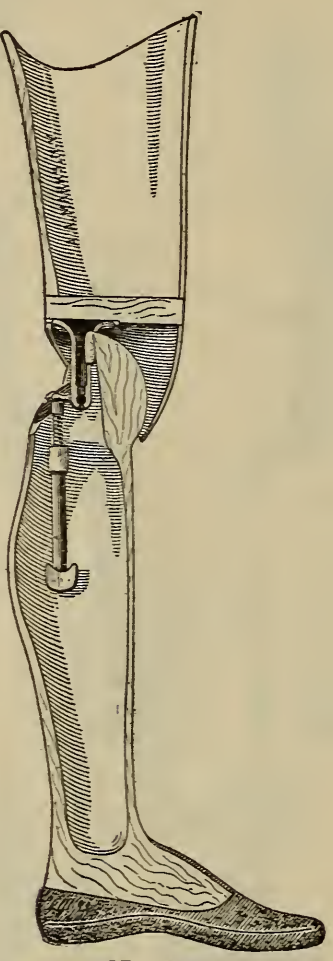


No. 528.

under their proper headings. Before the stump is inserted in the socket, a soft woolen or cotton sock is drawn over the stump, which not only provides a pleasant medium between the stump and

the socket, but provides an absorbing material which takes up the perspiration from the stump, keeps the stump in a healthy condition and the socket free from fouling. The knee mechanism of this leg can be better understood by referring to the following cuts. Cut No. 526 represents that section of the thigh and leg that contains the knee mechanism. The parts are together, as they are when in use. Cut No. 527 represents the two parts separated, and Cut No. 528 represents the different parts used in the connection.



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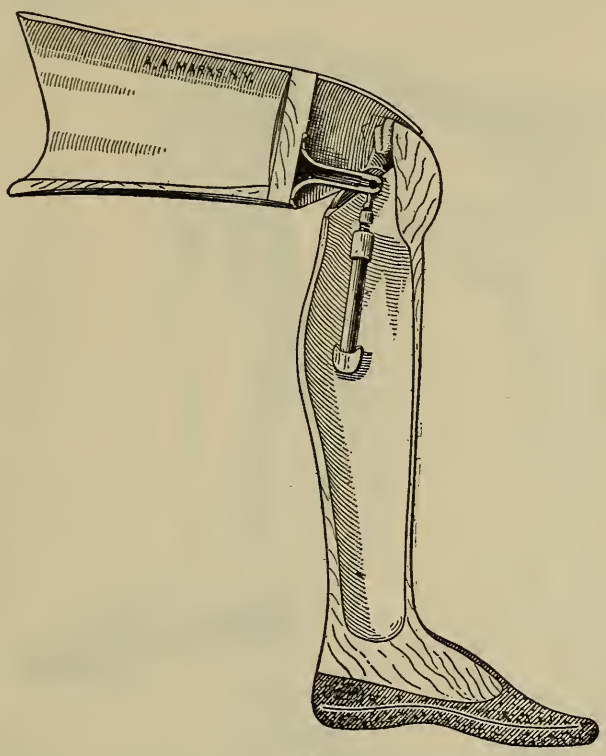
A represents the T-joint, which is attached to the thigh piece at its base. The two arms of the T work in journals made in the leg section. B, B, represent the cap screws; C, C, caps; D, spring piston; E, spiral spring; F, cylinder, and G, the three parts of the spring, namely, piston, spring, and cylinder placed together. The T-joint, A, has the shape of an inverted T, hence its name "T"-joint. The joint is made of tough gun steel, forged from one piece of metal and turned on the lathe. When the leg and thigh sections are placed together, the arms of the T-joint rest in boxes and are held there by two hard wood caps, C, C, which are secured by long steel screws, B, B, which depend for their holding on steel nuts that are imbedded in the leg.

The wearer has command over this joint; he can tighten or loosen the bearings at will, and have the joint work snugly or loosely, as he may choose. The pressure of the caps on the joint can be regulated by the screws, and thus any desired tension on the articulation can be made. This knee mechanism also admits "taking-up" for wear, and thus avoiding any rattling or noise that would result from attrition.

The small steel lever with ball on end, projecting from the back of the joint, operates in the cavity of the hard wood piston, D; the piston is inserted in one end of a steel spring, E, which has its lower part encased with leather and then placed in a drawn metal cylinder, F. The lower convexed end of this cylinder is received in a bridge placed in the interior of the leg in the region of the calf. The operation of

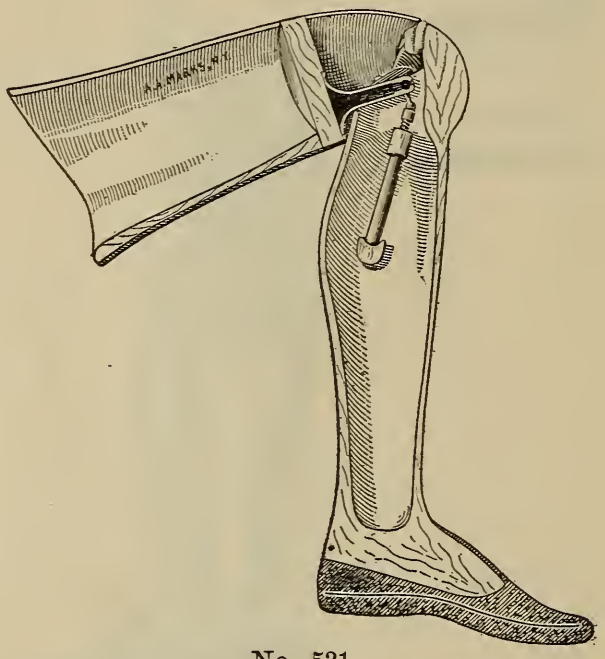


No. 530.

the spring is twofold; it urges the lower leg forward in walking, and holds it back at full flexion when sitting. This is accomplished in the following manner: When the leg is extended, the point of pressure is applied to the end of a steel lever, which extends about an inch backward of the center of motion in the knee. This lever revolves with the joint; when the leg is at full extension this lever projects horizontally backward, and the spring presses on a ball at its extremity holding the leg at extension. Cut No. 529 represents a sectional view of the leg at full extension. Cut No. 530 represents the leg partially bent. It will be seen in this position that the end of the lever has been carried around to a neutral point, when the spring neither urges flexion nor extension; but when the knee is flexed still more, as shown in Cut No. 531, the lever has passed forward of the neutral line and the spring

forces the ball upward, urging greater flexion; and when the flexion is at its limit the leg is kept in that position by the spring; thus the objection to the ordinary spring knee articulations is entirely removed, that objection being the tendency for the leg to fly out when the wearer is sitting and unguarded.

The power of the spring in the knee can be increased or diminished from time to time. If it is desired to increase the power a little packing can be tamped in the cylinder, and if it is desired to diminish the power, a ring or two of the spring can be cut off. If the wearer does not want a spring in the knee, he can remove it himself. He will not be required to disjoint the leg in order to do so. When the leg is together and in working order, the knee movement is arrested by the striking of the vertical shaft of the T-joint against a pad placed in the



No. 531.

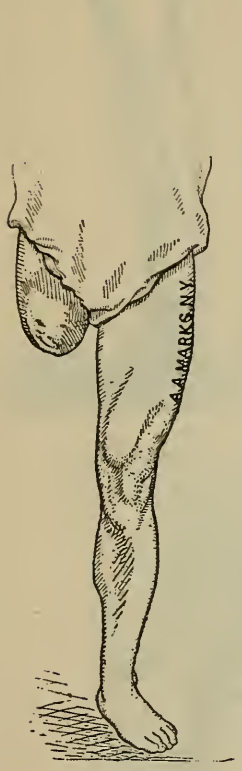
knee. This pad can be increased or diminished by the wearer, and the angular articulation of the knee made less or greater, as the wearer may desire.

The center of motion of this knee is placed considerably back of the line of the center of gravity of the wearer. The purpose of this is to secure the knee against treacherous bending.

The manner in which a leg for thigh stump should fit, depends largely upon the conditions of the stump. Generally speaking, the socket of the leg receives the stump quite tightly, and the posterior rim presses against the gluteal folds and the ischium. In some cases, especially with females, more or less pressure can be applied to the perineal regions. The end of the stump is not permitted to come in contact with any part of the fitting; it hangs practically in space. There are cases, however, when some pressure can prudently be applied to the extremity. Those cases are rare, but when they occur,

advantage is taken of them and a suitable pad is placed in the socket on which the end of the stump obtains a seat. End-bearing thigh stumps exist only when the ends of the femur are well covered with periosteal tissue. This condition is very seldom found, and never in amputations resulting from malignant diseases.

Ancient and occasionally modern manufacturers permit most of the pressure to be applied to the perineal region. While we permit some pressure to be applied at that place, we limit the amount, as too much pressure at the perineum is frequently the cause of suffering, besides having a tendency to influence the wearer to "straddle" and swing his artificial leg outwardly. As there is really no necessity for all the pressure being applied about that region or on the extremity of the



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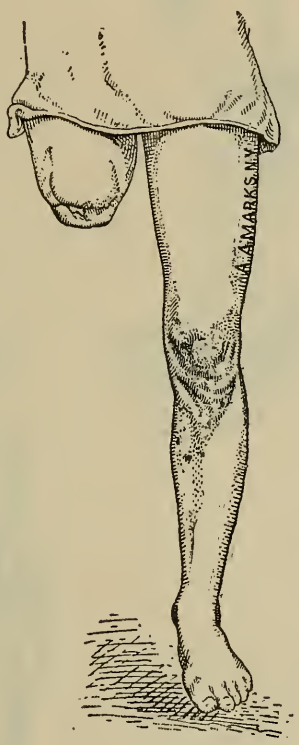

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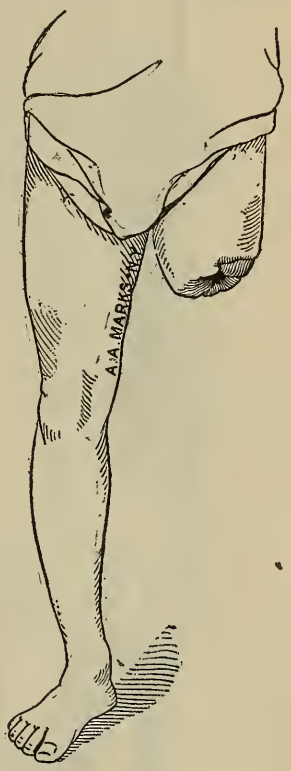


No. 534.

stump, we do for cautionary purposes apply most of the weight about the ischial region, where it is absolutely safe and can do no damage, and cannot improperly influence the leg.

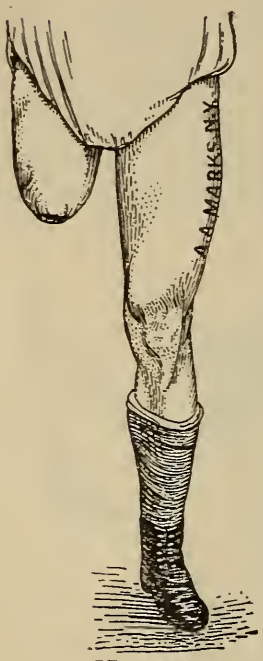
Cut No. 532 represents a thigh stump, extending only a short distance below the body, the stump smooth, but incapable of bearing pressure upon the extremity.

Cut No. 533 represents a longer thigh stump with deep fissures and cicatrices across the extremity, also incapable of bearing pressure upon the end.

Cut No. 534 represents a still longer thigh stump, with flattened extremity, due to the integumentary folds and cicatrices, non end-bearing.

Cut No. 535 represents a still longer thigh stump, which has a very thin covering upon the extremity of the femur.

Cut No. 536 is also a thigh stump, with cicatricial complications on the extremity.



No. 535.

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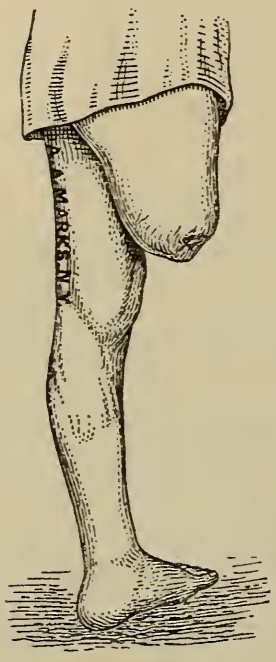

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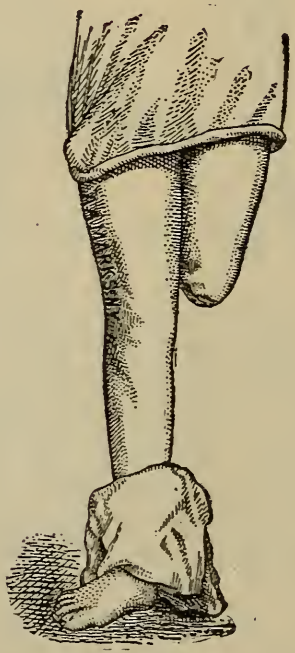


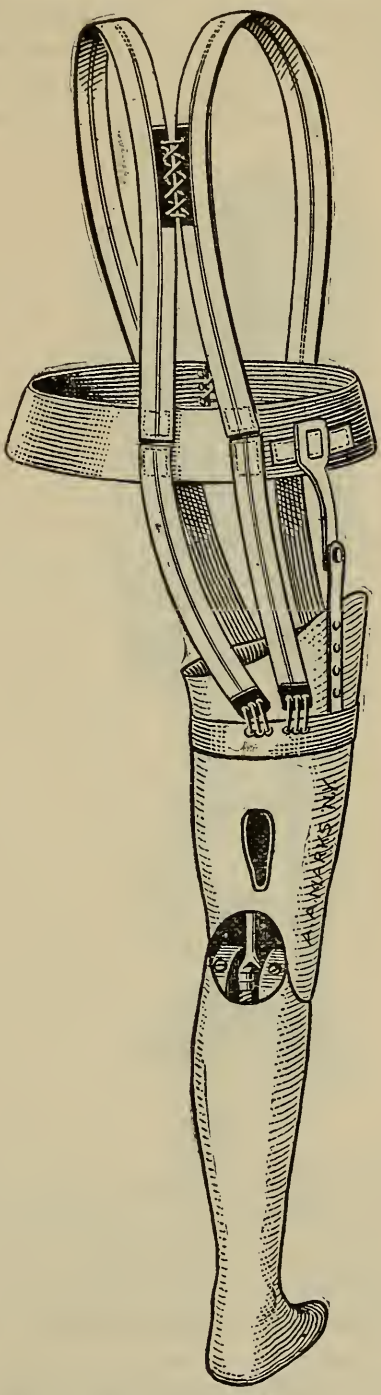
No. 539.

No. 537, a similar stump, but a trifle longer.

No. 538, a long and large thigh stump with abundance of tissue on the extremity, capable of bearing pressure upon the extremity.

No. 539, a thigh stump extending nearly to the knee, the extremity conical and tender.

No. 540.



No. 541.

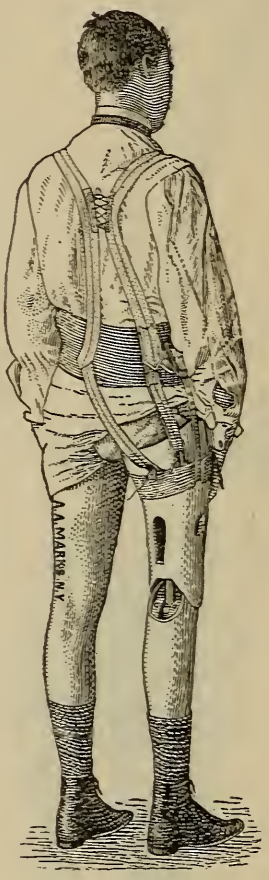
All of the above are types of stumps that are capable of wearing artificial legs constructed upon the plan of No. 525.

ARTIFICIAL LEGS FOR HIP-JOINT AMPUTATIONS.

The amputation of a leg at the hip joint or very close to the hip joint requires an artificial leg similar in construction to the No. 525, heretofore described, with the exception that some modifications must be made in the means of adjustment and connection with the body.

Cut No. 540 represents an amputation at the coxo-femoral articulation, after Furneaux-Jordan method, leaving a stump composed of tis-

No. 542.



No. 543.

sue and no bone. A tissue stump of this kind is capable of performing limited functions in the management of an artificial leg; a tissue stump is better than no stump at all. An artificial leg suitable for this stump is represented in Cut No. 541.

The stump, in an amputation of this kind, presents a very peculiar appearance. It is large and more or less flabby, with many deep cicatricial fissures and folds of tissue. The end of the stump is capable of bearing pressure, thus relieving pressure at the perineum and ischium.

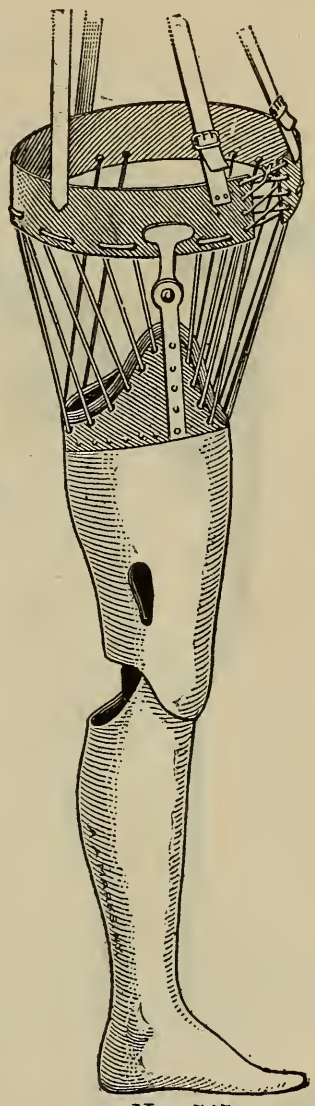
Cut No. 541 shows the means by which an artificial leg can be firmly attached to the body. Cuts Nos. 542 and 543 show the leg

attached to the body, properly secured by means of a waist band, shoulder straps, flexion and extension elastic straps, and the wearer ready to proceed in walking.

A knee lock, which is combined with the mechanism of the knee, prevents the knee from bending treacherously, and is found to be a desirable addition to limbs for hip-joint amputations.

This knee-lock mechanism is illustrated and explained on p. 53.

No. 544.



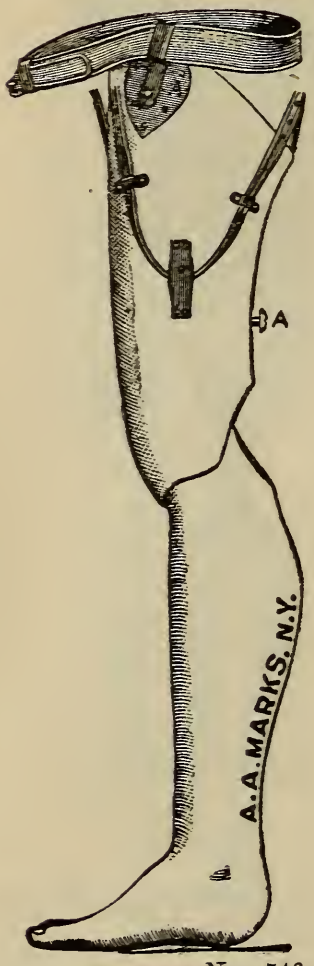
No. 545.

In cases of hip disarticulations, where there are no stumps projecting beyond the pelvis, it is found necessary to add a hip joint to the artificial leg.

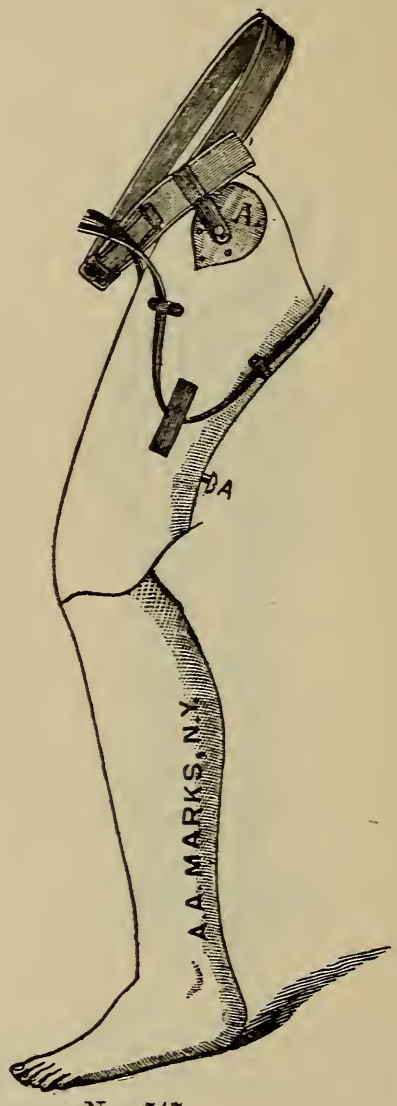
Cut No. 544 represents a hip-joint amputation, in which there is no protruding stump by which the artificial leg can be directed.

Cut No. 545 represents an artificial leg suitable for the above case. There is in this leg a knee-lock at the knee, a hip joint extending above the thigh piece, a waist belt, and necessary shoulder straps. The waist

belt assists in holding the leg in place by means of the elastic lacing band, which connects the front and back upper parts of the thigh piece to the belt. This method holds the leg firmly to the body when standing or walking. It is not deemed advisable to allow any hip motion while the wearer is walking. Hip motion is only admitted when stooping or sitting. An artificial leg for an amputation of this



No. 546.



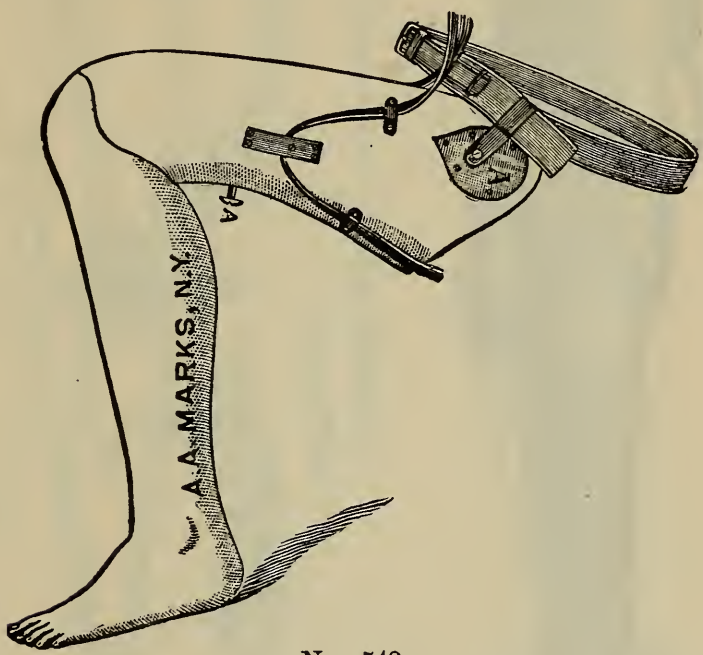
No. 547.

kind supports the amputated side in a very comfortable manner; the leg is thrown forward by means of a side motion to the body. The process of walking is attended with some difficulty at the start, but those adept in balancing, and possessing a fair amount of agility, soon learn to control a leg of this kind to advantage.

KNEE LOCK.

The knee lock is a device which we place in the knees of artificial legs that require some artificial means additional to the excellent mechanism of the knee joint, in order to keep the knees from flexing, or from flexing beyond a fixed limit, when the wearer is standing or walking, but which is capable of being thrown out of action so that full flexion can be obtained for sitting purposes. It is not very often that knee locks are required; therefore, they are only occasionally placed in artificial limbs.

Cut No. 546 represents an artificial leg with knee lock. A represents a sliding bar which can be pushed down or pulled up. When it is pushed down, the leg is incapable of moving at the knee, or is per-



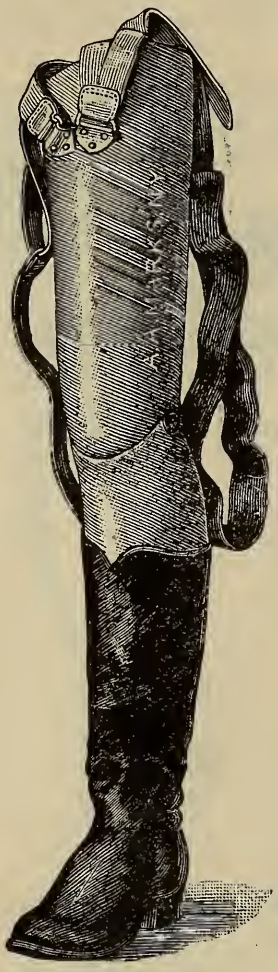
No. 548.

mitted to move to a desirable point, when the knee-lock will check the knee action, as represented in Fig. 547. When the knee lock is pulled up, it is thrown out of action, and the knee is capable of bending to right angles, as represented in Cut 548.

The knee lock is found of great value to equestrians, and is a great help to those who have short, weak, or deflected stumps. We have a patron, a Baptist clergyman, who finds the knee-lock indispensable when performing the rites of immersion. On account of the buoyancy of the lower leg, the knee without the lock would flex and remain flexed the moment the clergyman attempted to walk while in the baptismal font. Knee locks are also found advantageous by persons who live in snow-bound countries. When the knee is locked and prevented from flexing, the wearer is better able to wade through snow drifts.

The knee lock, hip joint, and waist belt can occasionally be combined to advantage, especially in legs applied to stumps that are unnaturally

deflected, abnormally abducted or adducted, or that in any way hang out of the normal lines. The knee lock places the knee under control, and the hip joint holds the leg in line. As these additional parts complicate the construction of the leg, add weight, and more or less hamper graceful and natural walking, it is not considered desirable to have them present in an artificial leg unless the conditions of the stump or the occupation of the wearer demand them.



No. 549.

No. 550.

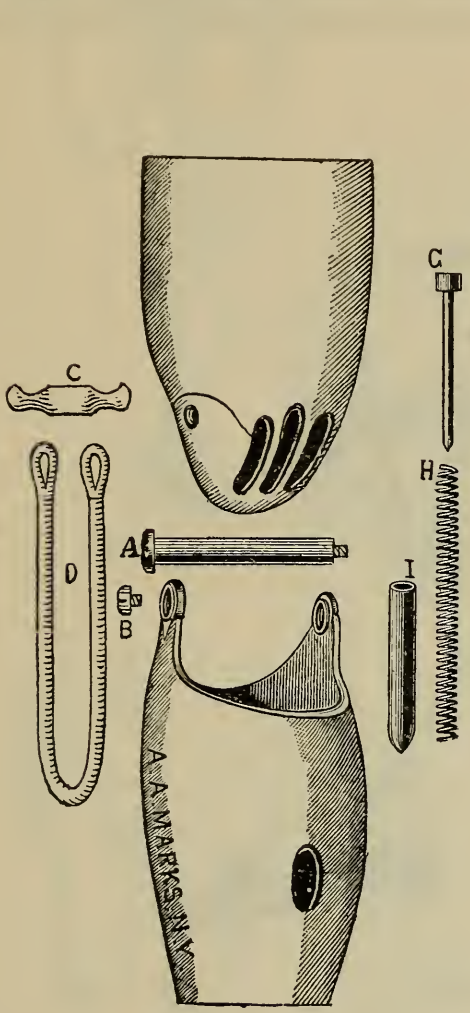
ARTIFICIAL LEGS FOR LONG THIGH STUMPS.

It is desirable in all artificial legs that the axis of motion of the artificial knee should be the same distance from the floor as the axis of motion of the natural. The mechanism in the knee of the No. 525 leg, heretofore described, occupies three inches of the thigh above the knee, or, in other words, the axis of motion is three inches below the lowest point to which the fitting can be carried; therefore, long stumps cannot be accommodated by using the knee mechanism of the No. 525 leg, and in order to accommodate long stumps it is found necessary to employ the bolt joint. This joint cannot be considered

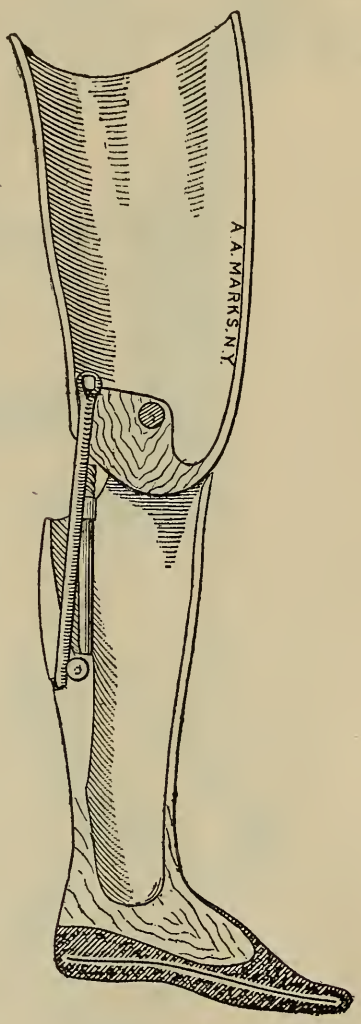
inferior, as the improvements lately made by us make it equal in merit to the T joint.

Cut No. 549 represents an artificial leg calculated for a long thigh stump. The leg is constructed of wood, covered with rawhide and enameled. It is terminated by a rubber foot, the same as No. 525, heretofore described.

Cut No. 550 represents a back view of the leg.



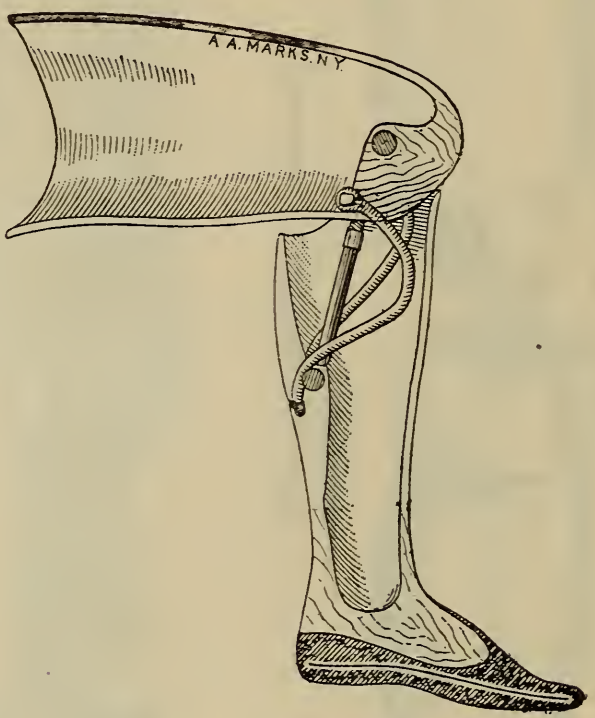
No. 551.



No. 552.

Cut No. 551 represents the knee section with all parts detached and exposed to view. By the assistance of these cuts the reader can better understand the knee mechanism, the manner in which the knee is disconnected and the leg put together and its movements adjusted. A, represents the knee bolt; B, the set screw. The bolt passes from the outside of the leg through the knee and is screwed into its place. It is there held by the set screw B. C represents the check key; D, the check cord; G, spring piston; H, spiral spring; I, cylinder. The upper ends of the check cord are terminated in loops. These ends pass through openings in the lower part of the thigh-piece. The key is passed into the loops and rests on the lower end of the socket.

Cuts Nos. 552 and 553 represent section views of the No. 549 leg. The first cut represents the leg at extension; the spring keeps the leg from flexing; the center of knee motion is back of the center of gravity of the wearer; therefore, there is no tendency for the leg to flex when the wearer is directly over it. When the leg is flexed the action of the spring is reversed, and holds the leg at flexion, so that there is no danger of the leg flying out when the wearer is seated and unguarded. The action of the knee is exactly the same as that described under style No. 525 leg.

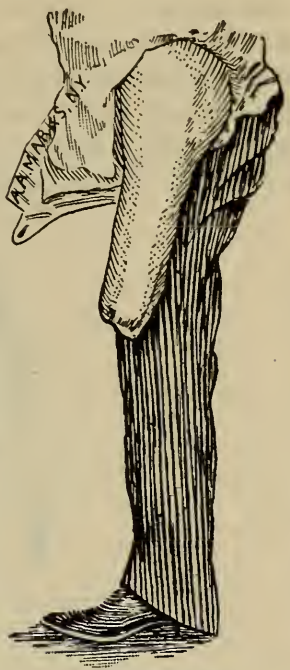


No. 553.

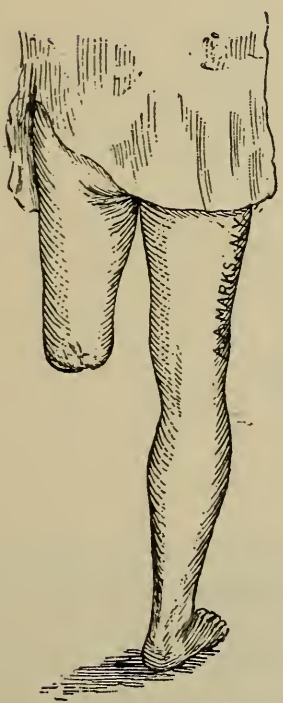
The check cord regulates the angular motion of the knee joint. It is adjusted by means of leather or felt pads, which are placed between the check cord and the block through which the cord passes. The pads can be reached through the opening in the calf of the leg. The manner in which these parts operate, and the relation they bear to each other, are shown in sectional cuts Nos. 552 and 553. The first represents the leg at extension, and the second at flexion. The knee bolt has a very long metal bearing. It passes through metal ears that are riveted to the lower leg, one on each side. The head of the bolt sinks into one ear, and the threaded end screws into the other. It will be seen that the knee mechanism of this leg is simple, noiseless,

and light, and that it is at the command of the wearer; the adjustments can be changed and parts replaced when accident or some unusual cause demands it.

No. 554.



No. 555.



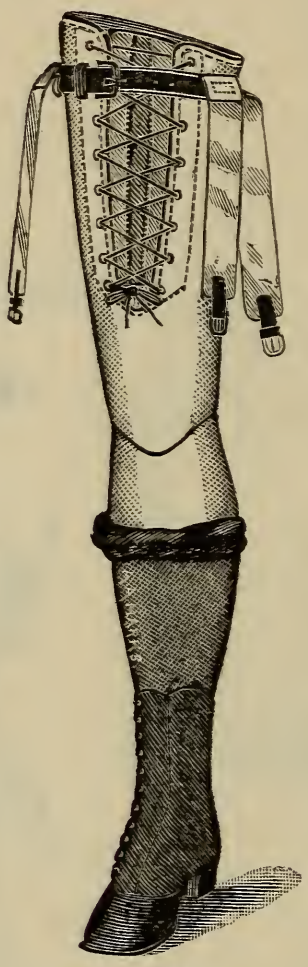
No. 556.

No. 557.

Cut No. 554 represents a long thigh stump, the extremity insufficiently protected to admit of end-bearing,

Cut No. 555 represents a similar but longer stump. The extremity

of the femur protrudes and is covered merely by cicatricial tissue, extremely sensitive, incapable of bearing pressure or enduring contact. Cut No. 556 represents a long thigh stump, well-protected extremity, capable of bearing pressure. Cut No. 557 represents a similar stump, well-protected extremity, end-bearing. It will be observed from the cut that the stump habitually inclines forward on account of contraction of the flexors. This, although a slight inconvenience at the beginning, disappeared a short time after the stump was put into active use by the wearing of an artificial limb.

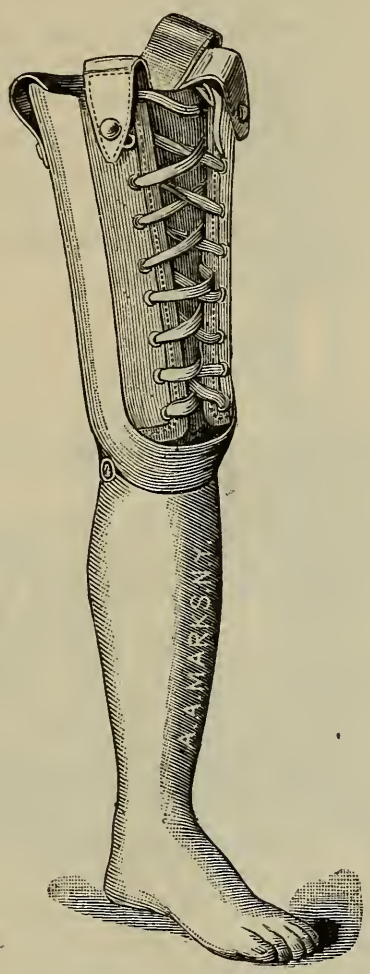


No. 558.

Occasionally long thigh stumps are well and evenly rounded, and are sufficiently protected on their extremities by periosteal and integumentary tissue to admit of pressure being applied to the extremities. Cuts No. 556 and 557 represent long thigh stumps capable of bearing pressure on ends. In cases of long, end-bearing stumps, and especially stumps that are flabby, a lacing front to the thigh-piece can be introduced to advantage, as represented in Figs. 558 and 559.

Where thigh stumps are not so long as to prohibit the use of the T-joint, the No. 558 leg is applied; and where the stumps are so long as

to demand the use of the bolt joint, the No. 559 leg is applied. In either of these legs a large proportion of the weight is applied directly to the extremity of the stump, and the balance of the weight is taken about the perineum and ischium and along the sides of the stump. The laced stump admits of more or less contraction and expansion to produce comfortably tight bearings. The stumps represented by Figs. 554 and 555 require the application of the No. 552 leg. Stump represented by Fig. 556 can be accommodated by the No. 558 leg, and stump represented by Cut No. 557 can be accommodated by the No. 559 leg.



No. 559.

The question is frequently asked, why not make all sockets for thigh stumps with lacing fronts, as represented in Cuts 558 and 559, as by doing so sockets are rendered more or less adjustable to changes that are likely to take place in stumps. In case a stump shrinks, the tightening of the socket will reduce the size of the thigh; and in case a stump enlarges, the letting out of the lacing will allow the thigh to distend and accommodate the growth. In reply to this question we argue that in most thigh stumps, especially those that are firm, the necessity of rigid fronts to the sockets is more important than th

feature of adjustability. It is as desirable in sockets for short and non-end-bearing stumps to have the fronts rigid as it is to have the backs rigid so as to properly support the superincumbent weight about the entire periphery of the socket. Sockets that are made entirely of wood are more durable than those that are made partly of wood and partly of leather. The leather absorbs perspiration, becomes soft and loses its rigidity, it becomes foul unless the wearer is very careful to keep his person clean; the odor from the leather that has absorbed perspiration becomes very offensive. The softening of the leather, the folds and wrinkles that follow, destroy, in a large measure, the efficiency of an artificial leg when all the weight has to be applied to the top border of the socket. These objections are regarded as tenable, and justify us in adopting the wooden sockets in preference to the partly leather ones for all thigh stumps that are not end-bearing.

The knee mechanism of the No. 558 leg is the same as that of the No. 525, and the knee mechanism of the No. 559 leg is the same as that of the No. 549. The material, construction, and finish are practically the same as heretofore described.

PRICES.

Artificial legs for hip-joint amputations, with hip joint, waist belt, and suitable suspenders, each $100.

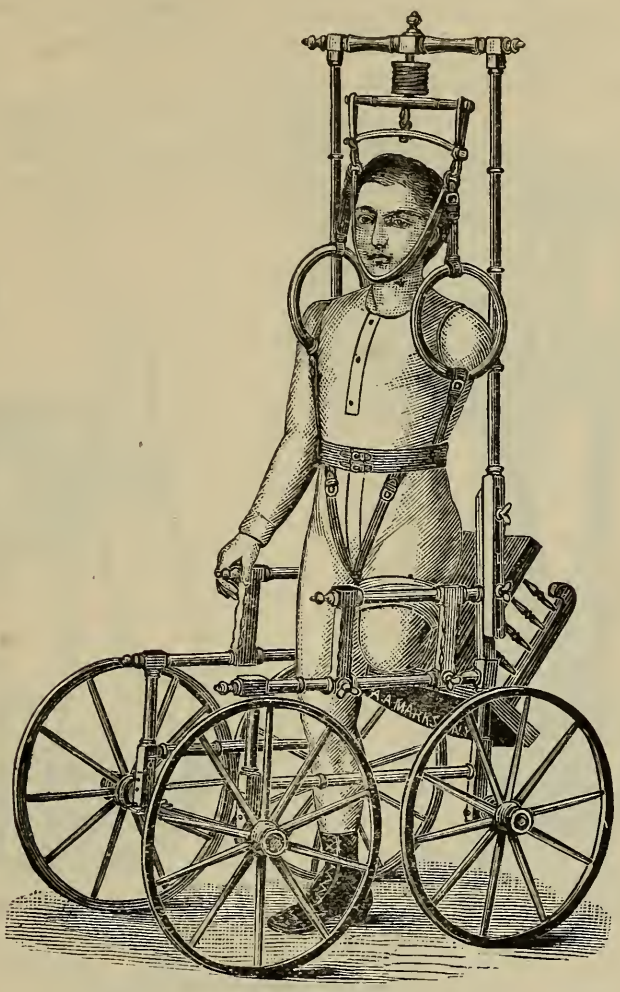
Artificial legs for thigh stumps, with necessary suspenders and a full line of accessories, each $100.

All measurements and diagrams required are fully called for on pages 178 to 182.

As an evidence of the range of possibilities in meeting difficulties, we will introduce the following case:

A deck hand on an ocean steamer was thrown from his feet when the vessel was struck by a tidal wave. He was thrown with such violence that his left arm and left leg were frightfully mangled. The arm was amputated at the shoulder joint, and the leg amputated a little above the knee. The hip joint of the left leg was dislocated, but yielded to treatment. A short time after the amputation the subject was taken with an epileptic fit and fell out of bed. The left hip was again dislocated, but was not noticed until two months after the occurrence. It was then deemed unadvisable to attempt a reduction. The subject was confined to his bed for several months, when he was permitted to go about the hospital and grounds in a rolling chair. When his stump was healed we were called to take charge of him and do what we could for him. Upon examination we discovered that, on account of the dislocation in the left hip, the stump was thrown out of plumb. It inclined interiorly and anteriorly, and from disuse and long confinement the right leg became involved, and the patient was unable to sustain his weight on that side. Our treatment of the case consisted in suspending him from a Meigs' Case apparatus, as represented in Fig. 560. By this contrivance he was supported from his perineum and arm-

pits, and could propel himself about by means of his remaining foot. After the use of the apparatus he regained considerable strength in his right leg, and an artificial leg was applied to the left side. In a brief time the right leg became strong, the stump hung in a vertical line,



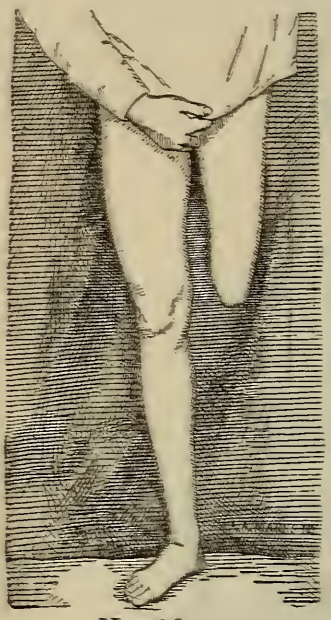
No. 560.

and the patient was able to walk with his artificial leg in a very acceptable manner. He returned to his home in Europe, and reported, not a great while ago, that he was getting along very well and able to attend to business.

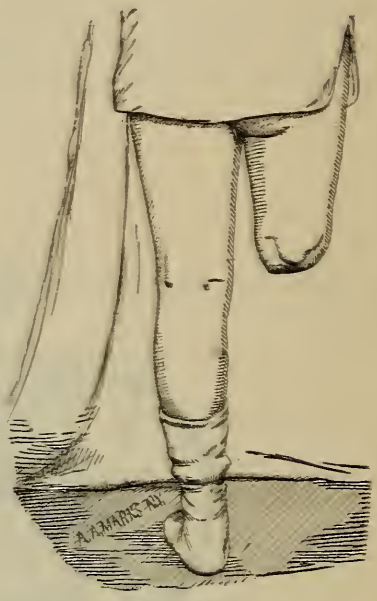
ARTIFICIAL LEGS FOR KNEE-JOINT AMPUTATIONS.

Amputations that are made through the knee articulations provide stumps that require prothetical treatment peculiar to the conditions that exist in each stump. Stumps resulting from such amputations may be tapering and end-bearing, may be tapering and non-end-bearing, may be nodulous at the extremity and end-bearing, and may be nodulous at the extremity and non-end-bearing.

A stump extending to the knee articulation that is tapering and end-bearing is one in which the condyles of the femur have been removed and the extremity of the stump protected with healthy tissue. The patella may be present or absent.



No. 561.



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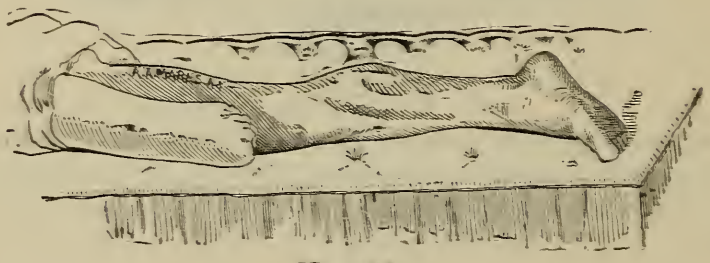
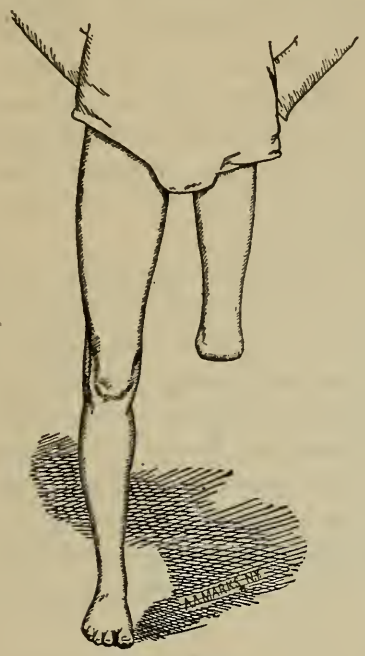


No. 563.

Cut No. 561 represents a thigh stump extending to the knee, the patella present. The stump is an end-bearing one, and may be regarded as exceptionally favorable. Artificial leg No. 549, page 54, represents the style of leg suitable for a stump of this character.

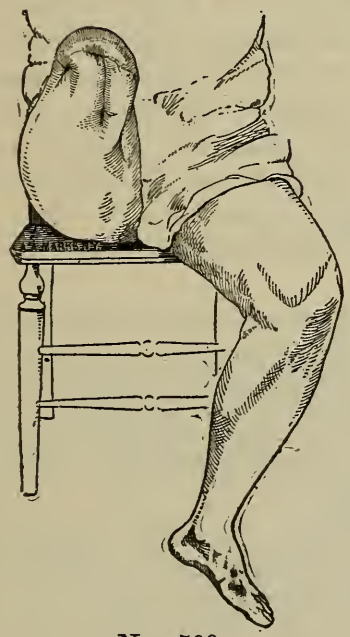
Cut No. 562 represents a thigh stump extending to the knee, extremity well protected, capable of bearing weight. As this stump is

flabby and end-bearing, No. 559 leg, page 59, is especially suitable. The extremities of both of the above stumps rest upon comfortable pads placed in the bottoms of the thigh pieces.

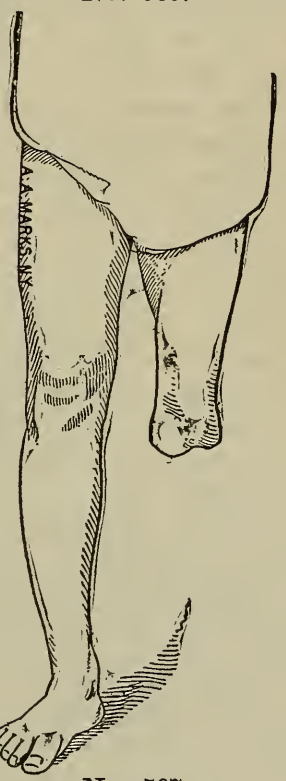


No. 564.

No. 565.



No. 566.



No. 567.

Thigh stumps that extend to the knees that are tapering and non-end-bearing are those that result from amputations in the knee articulations with condyles removed, patellas either absent or displaced, the natural coverings to the bones at the extremities removed, and the ends of the stumps incapable of bearing weight. This condition is not always the result of imperfect surgery; it is more frequently due

to sloughing or some affection of the bone. The No. 549 leg, illustrated on page 54, is applied to such stumps.

Cut No. 563 represents a thigh stump extending to the knee, the end incapable of bearing pressure, the condyles and all the natural coverings to the bone removed at the operation. Bunches of tissue or ganglia were gathered at the extremity and back of the stump, the integumentary tissues had puckered considerably, and the presence of cicatrices on and about the end all conspired to make it extremely sensitive, hopelessly incapable of ever enduring the slightest pressure or contact upon or about the extremity. Cut No. 549, page 54, illustrates the style of leg suitable for that stump.

A stump extending to the knee with a nodulous extremity, and capable of bearing weight on the extremity, is the most favorable of all the knee stumps. Stumps of this class result from amputations through the knee articulations, the condyles remaining untrimmed, the natural coverings to the bones permitted to remain on the articulating surfaces, the patellas, if present, placed and firmly held in the intercondylic spaces, flaps well carried to the posterior, and the cicatrices some distance from the ends. Stumps possessing these favorable conditions can be comfortably and efficiently accommodated with artificial legs constructed on the plan of No. 559, illustrated and described on page 59.

Cut No. 564 represents the most fortunate type of stump extending to the knee articulation, the nodulous extremity due to the presence of the condyles, the perfect and natural coverings upon the extremity providing conditions that are desirable. No. 559 leg applied to case of above character fitted so that the entire weight of the wearer can be borne upon the end, the nodules providing means for holding the artificial leg in place without depending entirely on shoulder suspension, meets the requirements in the fullest degree.

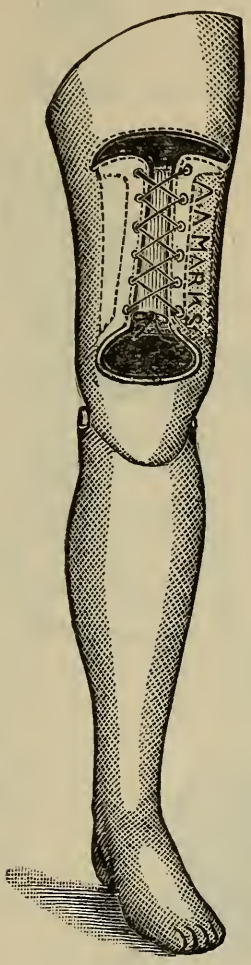
Cut No. 565 represents a side view of a similar stump. Style No. 559 leg is especially suitable for this stump.

A stump extending to the knee, with a nodulous extremity and incapable of bearing weight upon the extremity, although unfortunate, is capable of prothetical treatment. The causes for the inability to bear pressure on the extremity are not always bad surgery; sloughing, bone degeneration, hyperæsthesia, etc., are frequently the causes of sensitive, irritable, and delicate extremities.

Cut No. 566 represents a stump reaching to the knee, condyles present, but extremity covered with integumentary folds, deep fissures and cicatrices. Cut No. 567 represents a stump extending to the knee, condyles and patella present; but bunches of soft and sensitive tissue, hanging from the extremity, prevent the weight being applied to the extremity, and prohibits any contact whatever. Stumps Nos. 566 and 567 were fitted with artificial legs constructed on the plan of No. 568.

Artificial legs for knee-joint amputations, such as Nos. 566 and 567, must be so constructed and fitted that weight will be applied at places of vantage, and the tender and irritable extremities thoroughly protected and not permitted to bear pressure. The ischial or perineal regions,

and the sides of the stump are the only available places that will admit of close and firm contact. The sides of the extremities of sockets for these types of stumps must have ample recesses and cavities that will provide protection and prevent pressure on the nodules, condyles, or other bony processes. All pressure on the sides of such



No. 568.

stumps must be some distance above the extremities. In the No. 568 leg, illustrated above, every condition is properly provided for. The top of the socket is annular and of proper size and shape to impinge against the gluteal and abdominal folds, and against the ischium. The socket narrows so as to press tightly against the sides of the stump, and is provided with ample cavities to accommodate the bony processes on the sides of the extremity of the stump. A part of the front is of leather, with eyelets and lacing; the stump is inserted from the top in this leg and held in place by means of a leather lacing front. The knee mechanism and the general construction of this leg are the same as illustrated in Fig. 551, page 55. Means of suspension are explained on pages 167 to 177.

Price for artificial legs for knee-joint amputations, either style, Nos. 549, 559, 568, with suitable suspenders and a full line of accessories, each $100.

Measurements and diagrams required are called for on pages 178.

ARTIFICIAL LEGS FOR BELOW-KNEE AMPUTATIONS.

Amputations that have been made below the knees, or, in other

No. 569.

No. 570.

No. 571.

words, through the tibias, leave stumps that are to be considered according to their classes, arranged in the following order:

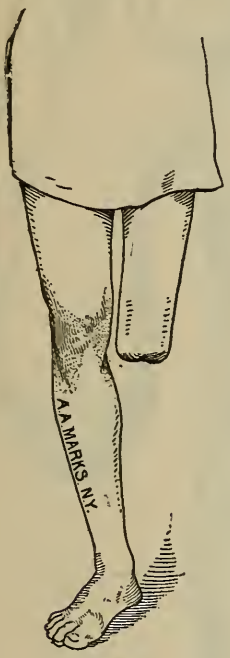
First. Those that are close to the knees, that are extended and nchylosed.

Second. Those that are close to the knees, that are flexed when in se, or that are commonly called "knee-bearing" stumps.

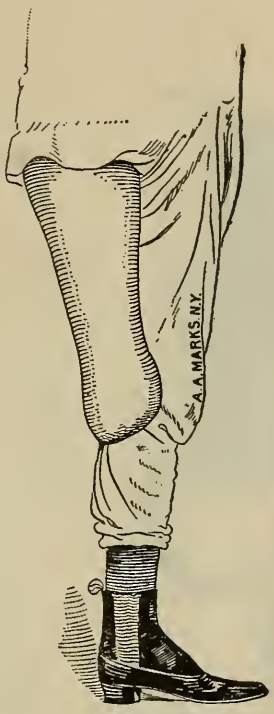
Third. Those that are long and mobile in the knee joints.

Fourth: Those that are long and partially contracted in the knees, ith limited knee motions.

The first class is comprised of those stumps that extend to a point, a hort distance below the knees, in which control of the stumps by the nee joints has become destroyed or impaired. The extremities of such tumps are seldom capable of bearing weight, and all the support must e applied to the thighs.



No. 572.



No. 573.

Cut No. 569 presents a side view of a stiff knee, stump nearly straight.

Cut No. 570 represents the case with suitable leg applied, patient sitting, and Cut No. 571 represents the same with patient standing. Style No. 574 leg was applied to this case.

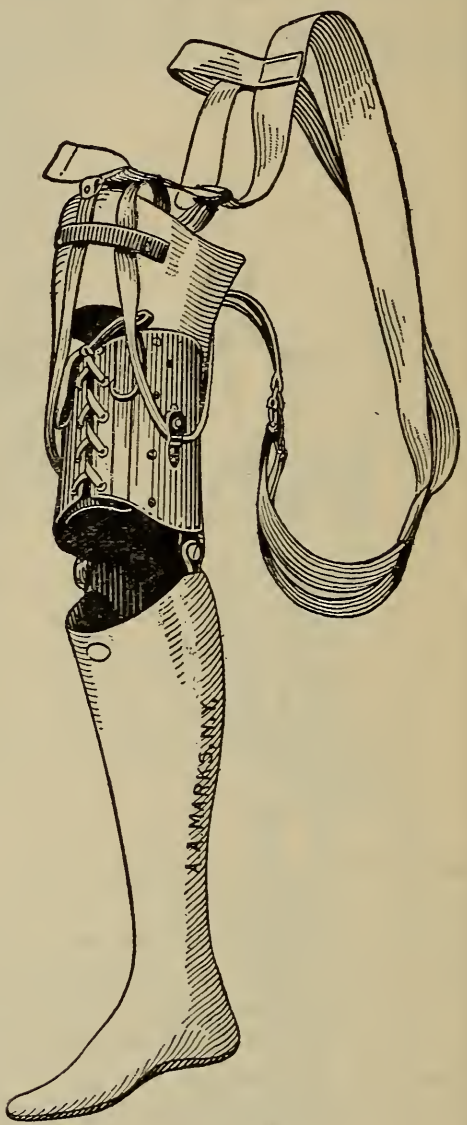
Cuts Nos. 572 and 573 represent views of similar stumps. An artificial leg, suitable for any one of these stumps, must be so constructed as to provide knee articulation, and take all the support above the knee.

Cuts Nos. 574 and 575 represent artificial legs suitable for such stumps. These legs will properly support the wearer without elongating the thighs. They will admit of flexion and extension in the knees to accommodate sitting purposes and to produce a lifelike motion in walking.

The thigh portion of one of these legs has the contours of the thigh of

the amputated side. No. 574 represents the leg with entire front provided with leather, adjustable to a tapering thigh, but in cases where the thigh is straight and weight has to be applied to the upper border of the socket, the socket must have an annular top, as represented in Cuts 575 and 576. The annular top makes the wearing of one of these legs very comfortable and pleasant by providing a continuous rim of wood to come in contact with the ischial, perineal, and inguinal regions, this is a desirable provision for taking weight for a stump of the character under consideration in which the sides are nearly parallel.

No. 574.



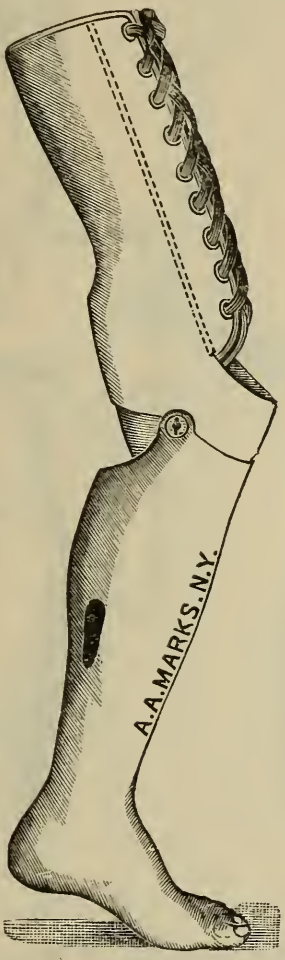
No. 575.

The stump is inserted in the front in No. 574 leg and at the top in the No. 575 leg. After the stump is in place, the leather form is drawn tightly by means of lacing; the leg is held securely without the necessity of heavy or tight shoulder strappings. The stump from the knee down, when tender, hangs pendent without taking any bearings.

ngth of tibia insufficient to be of service in controlling the move-
s of a leg constructed on the plan of No. 589.

hen either of these conditions exists, the stump is necessarily a
-bearing one.

frequently occurs that, from long periods of disuse and from
ually carrying the stump in a flexed position, the knee flexors
me permanently contracted. In such cases, a knee-bearing artifi-
leg should be applied. It may, however, be safely asserted that



No. 581.

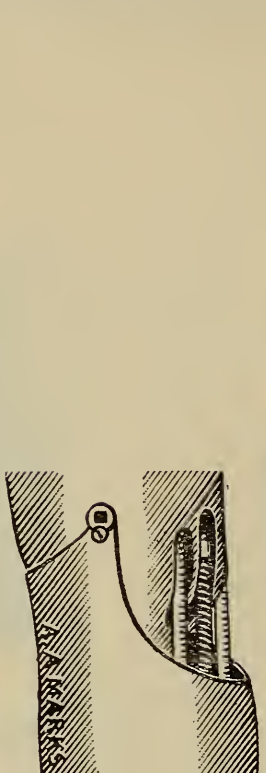
ll contractions of less than one-half the natural movement, and in
h there are at least three inches of tibia left, artificial legs con-
cted on the plan of No. 589, can be prudently applied. Legs of
kind bring gentle, constant, and painless tension on the flexors,
by degrees force them to relax, and thus ultimately obtain full
e movement.

the length of stump is a question of doubt in the selection of
e of leg to be worn, the following suggestions may be of assist-
e: Flex the stump to right angles; if the stump projects two inches

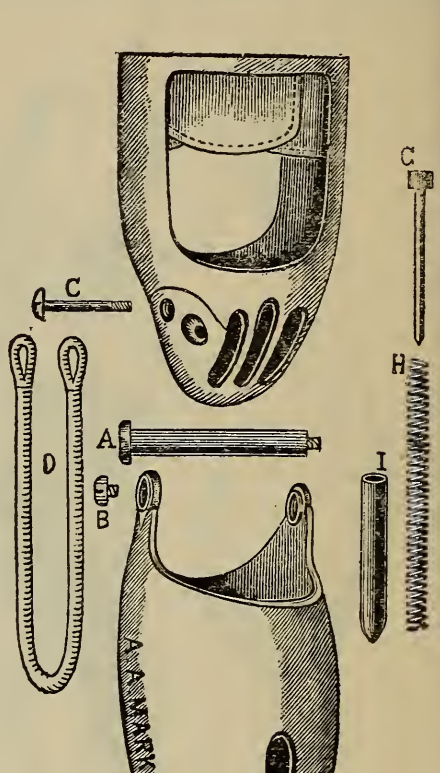
from the back of the thigh or popliteal space, it may be consi
safe to select the socket leg, style No. 589, but if the projection i
than two inches, it may be considered that a knee-bearing l
necessary.

Cut No. 581 represents the side view of a knee-bearing leg.

The socket and leg are composed of wood, covered with raw hid
enameled. The socket is excavated to fit the thigh and stump
fortably; the leg portion is excavated to reduce weight, the foot



No. 582.

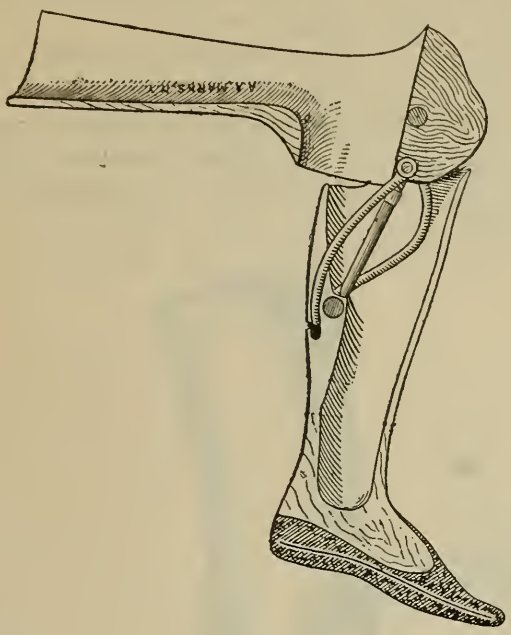


No. 583.

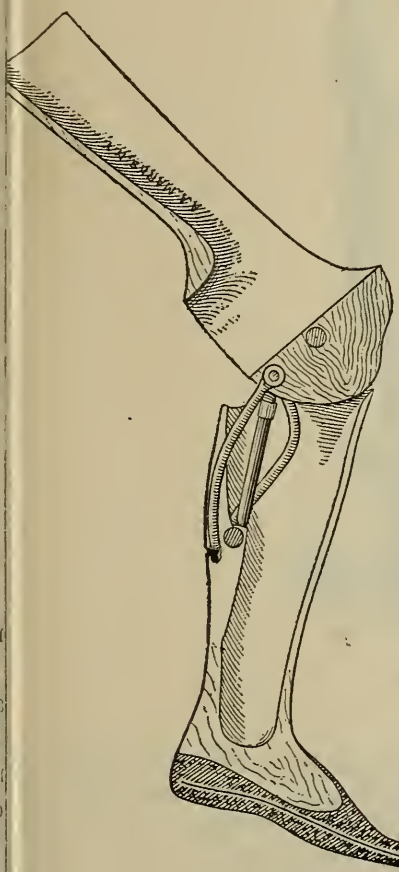
rubber, as described in the fore-part of this book; the mechanism
the leg is explained below.

Cut 582 represents a side view of the knee, with parts connected,
583 represents the same with all the parts separated. A represents
knee bolt which holds the thigh and leg sections together and con
tutes the axis of the knee. The bolt is flanged at one end and threa
at the other. When the bolt is passed through metal ears that
riveted to the lower leg, the head sinks into its bed and the threa
end screws into the opposite ear. The set screw, B, placed into
flanged end, prevents the bolt from working out. C represents che
cord screw; D, check cord; G, spring piston; H, spiral spring;
cylinder. The relations and functions of these parts can be und

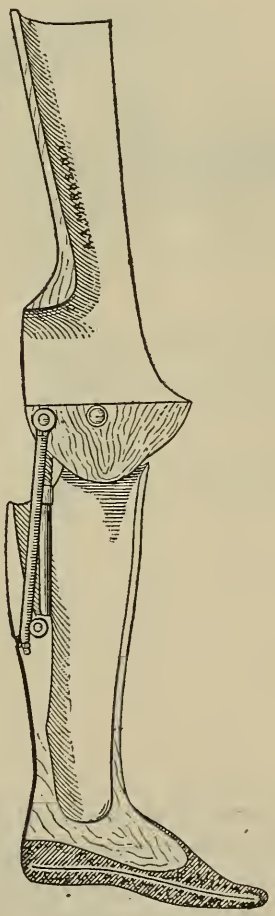
ood by examining cuts Nos. 584, 585, and 586. These represent the g with knee fully flexed and partially flexed, and at full extension.



No. 584.



No. 585.



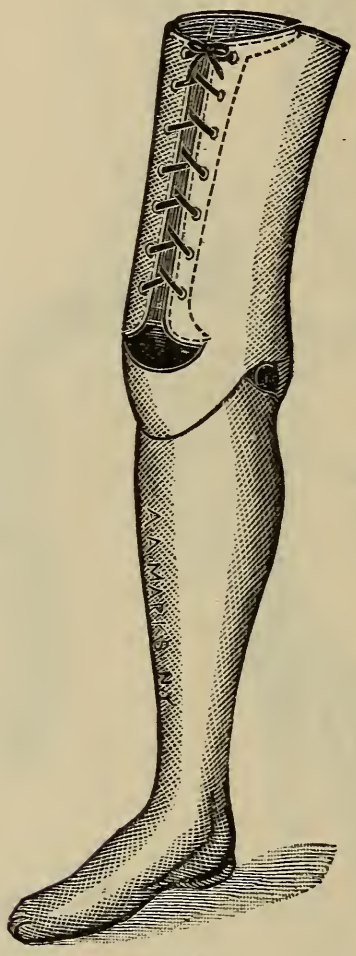
No. 586.

action of the spring holds the leg at flexion when the wearer is ed, and urges the leg forward when the wearer is walking. The ge of articulation can be regulated by means of pads placed between

the lower end of the check cord and the vertical bridge. These pads can be reached through the opening in the calf of the leg. The upper loops of the check cord are received in their respective channels and through them a steel screw is passed and set.

The knee mechanism of the knee-bearing leg is very durable, and will withstand severe service for years.

The center of motion being placed below the natural knee, in style No. 581 leg, causes a disparity in the lengths of the two thighs; that is, the length of the thigh from the body to the end of the artificial knee

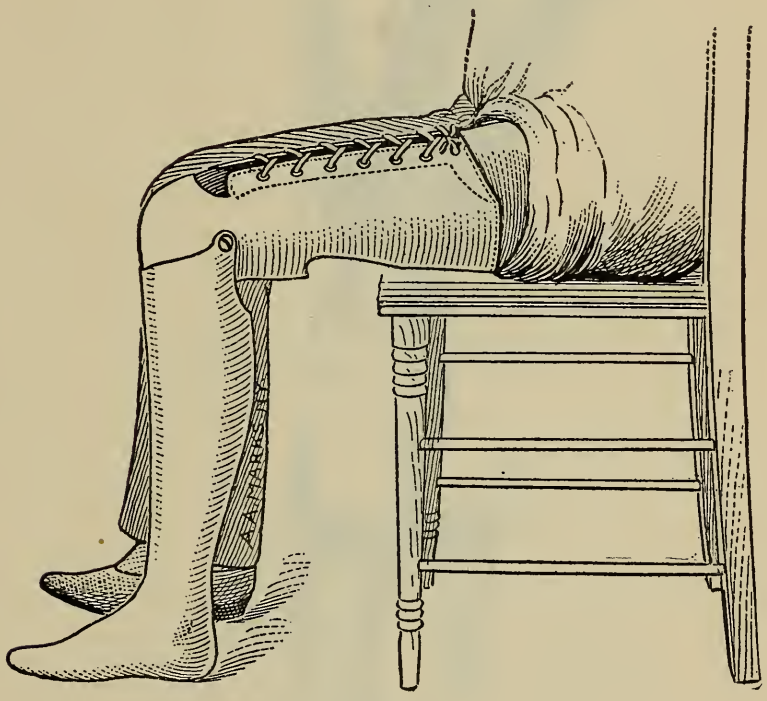


No. 587.

when the artificial leg is in place, is from two and one-half to th inches greater than that of the natural thigh. The durability of knee-joint mechanism in this style of leg fully compensates for extra elongation of thigh; besides, the mechanism above descri admits of the minimum width at the knee; for, if the artificial k articulations are placed on either side of the natural knee, in order make the center of articulation of the artificial knee coincide with center of articulation of the natural knee, there must be an addit of at least three-quarters of an inch on each side of the knee; this

produce a noticeably abnormal width at the knee which can only be concealed by wearing very wide trousers. The choice of style remains with the wearer; if he prefers the wide knee to the elongated thigh, and is willing to sacrifice the gain in durability, he can have the leg constructed with side joints, as represented in Figs. 587 and 588.

The center of knee motion in an artificial leg constructed on the plan of No. 587 is brought to the sides of the knee by means of ginglymoid joints, the mechanism of which is represented in Fig. 590. The check cord is practically the same as that represented in Figs. Nos. 582 and 583. This leg does not appreciably elongate



No. 588.

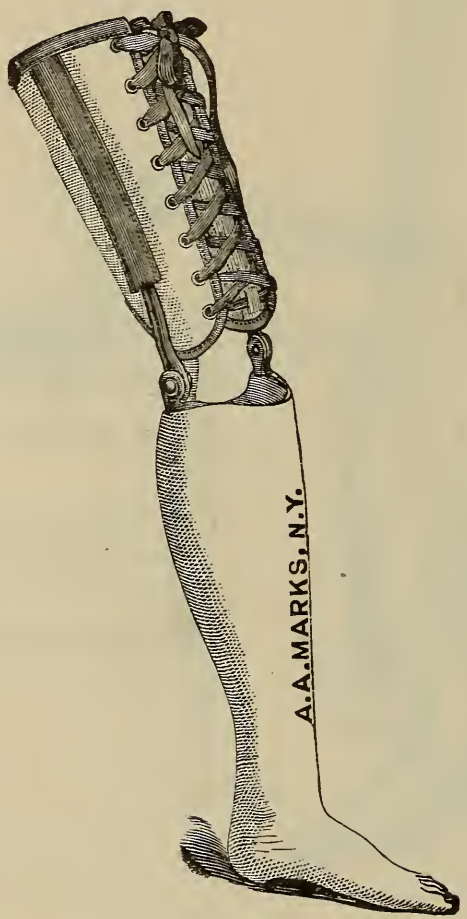
the thigh; it admits of the distance from the center of motion of the artificial knee to the floor to be approximately the same as that of the natural knee; but, while there is a gain in this respect, there is a loss in durability. It is, however, a question for the wearer to decide, which of the two legs to select. If the selection is left to us, we invariably decide on the No. 581 style for all knee-bearing stumps.

The third class of leg stumps comprises those stumps that extend from a point two inches below the knee to any point above the ankle, with knee joints that are mobile or but slightly contracted.

Cut No. 589 represents the usual form of artificial leg for below-knee stump or tibial stump.

Any stump that has a projection of two inches from the line of thigh when the stump is bent at right angles, and that has more than one-half knee movement, can be fitted with a leg of this type.

This style of leg is constructed of a thigh part made from substantial leather; willow or basswood is used in the leg socket, the side joints are steel, and the foot is of rubber. The thigh piece is shaped to the contours of the thigh; the leg socket is excavated to accommodate the stump properly and comfortably. The exterior of the leg is shaped to



No. 589.

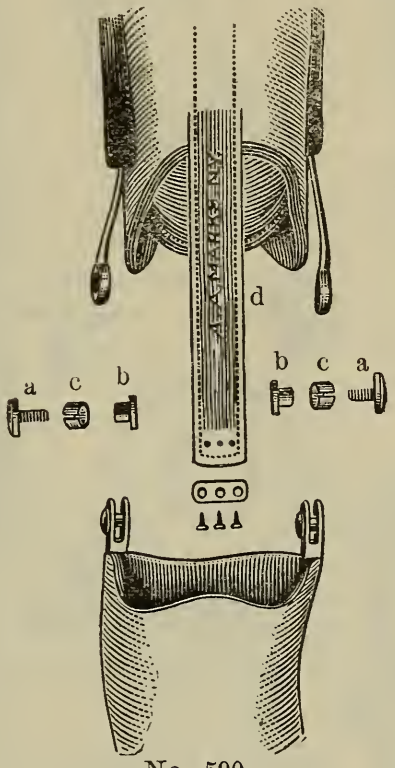
as near the natural form as the interior will admit of; the socket is strongly banded, then covered with raw hide and enameled with a waterproof preparation that has a soft flesh tint. The wood from which the leg is carved is carefully selected, thoroughly kiln-dried, and the choicest that can be obtained. The thigh piece is made of oak tanned russet leather, lined with substantial buckskin. The knee joints are made of tough steel, and are of the ginglymoid plan; the wearing surfaces are made very hard. Cut No. 590 represents a section

of the knee, with the working parts separated; aa represents screws that hold the bolts, bb, in place; cc represents bushings that work on the bolts and receive the wear; d represents check strap, which regulates the angular motion of the knee articulation.

Price $100.00 each.

The mechanical parts of the knee joint are fully illustrated in Cut 592.

Side joints, sometimes called "hinge joints" or "ginglymoid joints," are used for legs in amputations below the knees, and occasionally for knee-bearing legs. These joints are more serviceable and durable when constructed so that one of the parts is admitted between two lips of the other part, the two parts connected by bolts and screws. The methods

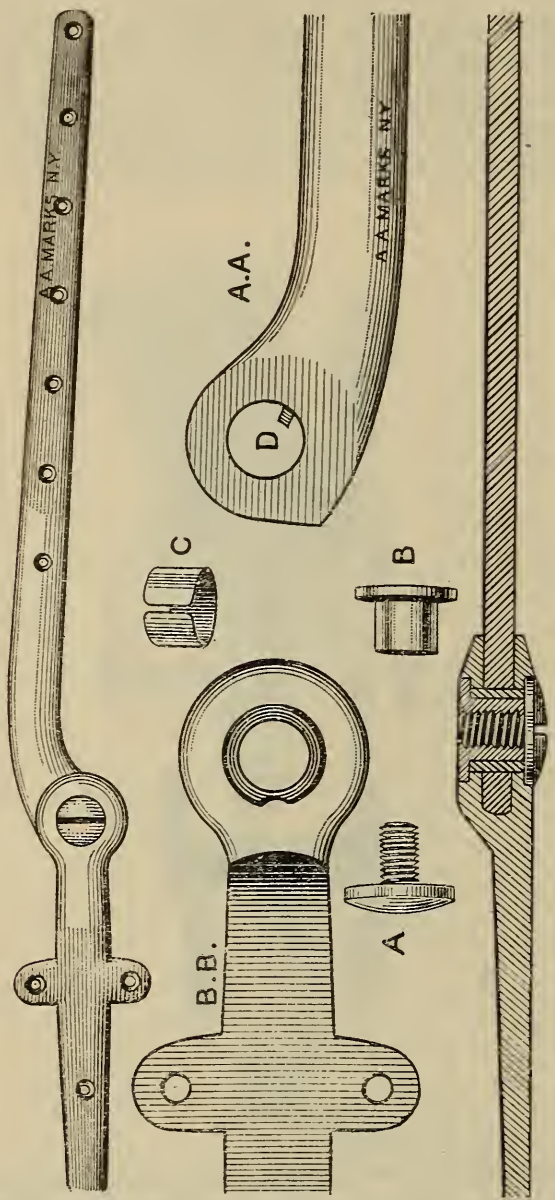


No. 590.

employed by some makers of placing one part of the joint by the side of the other and bolting them together is unsatisfactory, as joints made that way wear irregularly sidewise, and admit of a wabbling motion after a short service. If the lateral strains on the upper sections could always be kept the same, this would not occur; but contracting the thigh of the artificial leg by lacing, in order to properly compress the reduced natural thigh, or by distending the artificial thigh in order to accommodate a natural thigh that has grown or enlarged, will force this irregular pressure, and unequal wear on the bearings will result. This cannot be avoided when the lap joint is used, but when one part

of the joint works within the slotted end of the other part, the entire upper section is held firmly to its bearings, and the wearing on the sides of the joints becomes minimized.

The greatest wear in any joint is upon the bolt that holds the parts



No. 591. No. 592. No. 593.

together, and as the wear is the greatest when a person's weight is directly over the leg and becomes less as the leg is flexed, the bolt wears irregularly; and as the wearing surface on the bolt has heretofore been limited to the thickness of the section that works upon the bolt, the wear has been very rapid.

The object of the present improvement is to increase the wearing surface as much as possible, and to have the wearing parts independent of the parts that resist strain, so that the wearing parts can be highly tempered and the parts that resist strain be left untempered, so that their supporting strength will not be impaired.

In the improved joint, the wearing surface is increased over one hundred per cent. It covers the entire surface of the bolt, and the interior surfaces of the holes in the lips of the lower joint. By referring to Cut No. 592 on opposite page, this mechanism will be clearly understood. A A represents the upper joint, BB represents the lower joint, C represents a long bushing, which passes through the two lips of the lower joint and through the upper joint; it becomes immovably fixed to the upper joint by means of the lug D. This lug holds the bushing by passing in the slot in the bushing. The bolt, B, passes through the long bushing and becomes immovably fixed to the lower joint by means of the stop pin, which is fastened to the hub of the lower joint and fits a recess made in the head of the bolt. The screw, A, holds the bolt in place and clamps the joint.

A glance at the sectional Cut No. 593 will show how these parts work together. Every movement of the joint causes the long bushing to revolve about the entire surface of the bolt and in the lips of the lower joint. This mechanism prevents any wear from taking place on either the upper or lower sections, and distributes the wear that takes place over the entire area of the bolt. The bushing and bolt are both made very hard, and can be removed and replaced with new ones at any time that the wearer may choose to do so.

A pair of these joints has been subjected to a practical test, equivalent to that of being worn by a man weighing two hundred pounds, walking two miles every day for six consecutive years, without resulting in the slightest perceptible wear or lost motion. The joints are made of the most suitable steel, forged from solid material, faced and slotted with absolute accuracy, drilled, reamed, and countersunk in templets, the parts fitted to a nicety, and thoroughly tested, every pair warranted.

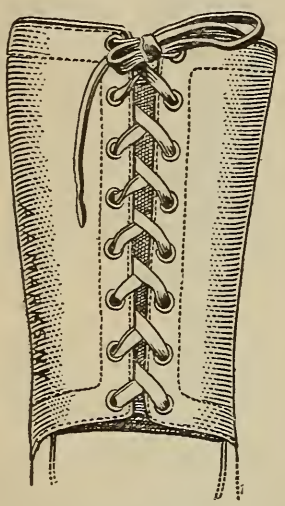
The thigh-pieces are of durable leather, usually oak tanned russet; they are formed to the shape of the thigh, and covered on the inside with buckskin. There are several methods by which the thigh pieces are made to compress the thigh; buckles and straps are sometimes used; metallic clamps are occasionally preferred, but the greatest number of limb-wearers find a lacing method the most satisfactory, as that method admits of nicer adjustment, and is neat and durable.

Cut No. 594 represents the older method of lacing; a row of eyelets is placed on each front edge of the thigh piece, and a strong buckskin lacing passes through the same. This method has been in vogue for many years, and is still preferred by many wearers to any other system.

Cut No. 595 represents a system of lacing that has met with some favor; a row of hooks is placed on one edge of the thigh piece, and a row of eyelets on the other. When it is desired to remove the leg, the lacing is simply slipped off the hooks and allowed to remain in the eye-

let holes. When the leg is put on, loops of the lacing are put over the hooks.

Cut No. 596 represents the latest device for rapid application of a leg: a row of studs is placed on one edge of the thigh piece, and a row of eyelets on the other edge; a separate piece of leather is provided with a row of eyelets on one edge, and a row of stud-holes on the other edge. This strip of leather is laced to one side of the thigh piece and



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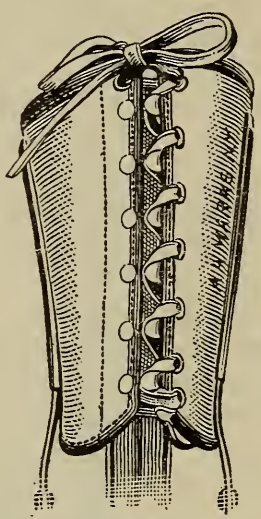

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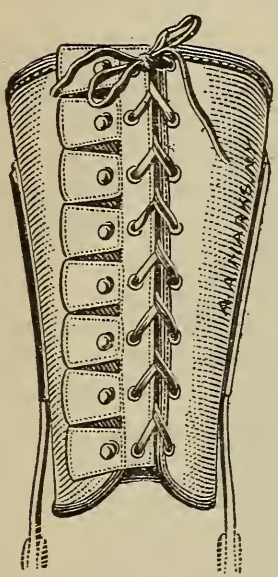
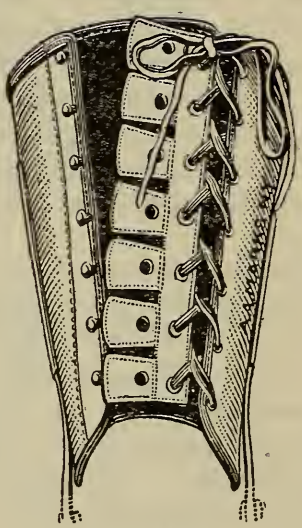


No. 596.



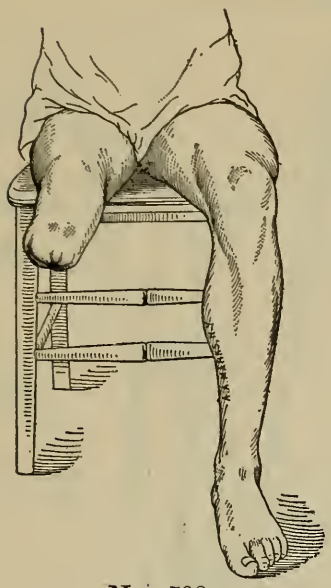
No. 597.

uttoned to the other side; the lacing can be adjusted once for all. When it is desired to remove the leg, one side is simply unbuttoned r slipped off the studs, as represented in Cut No. 597. This device as been highly commended by many wearers.

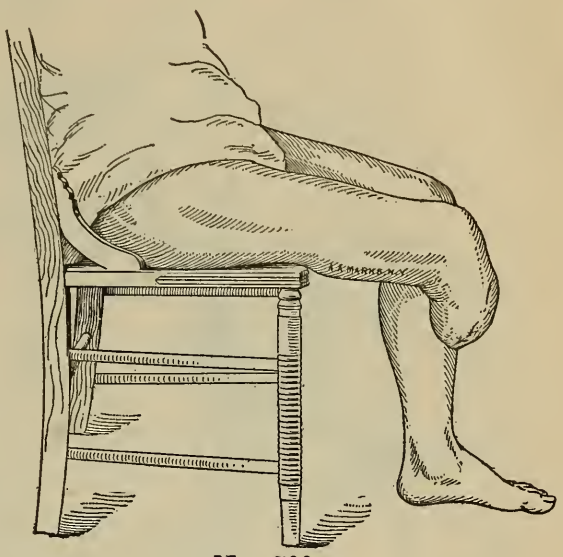
Cut No. 598 represents a short tibial stump, slightly deflected outvardly, extremity poorly covered with tissue, knee mobility normal.

Cut No. 599 represents a tibial stump, normal knee motion, great abundance of tissue on the extremity.

No. 600 represents an amputation in the middle of the calf, knee

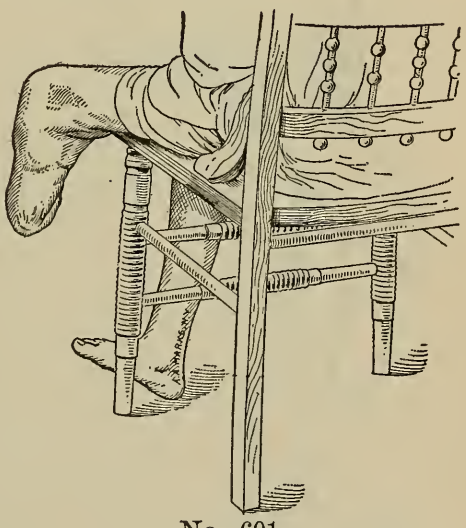


No. 598.



No. 599.

No. 600.



No. 601.

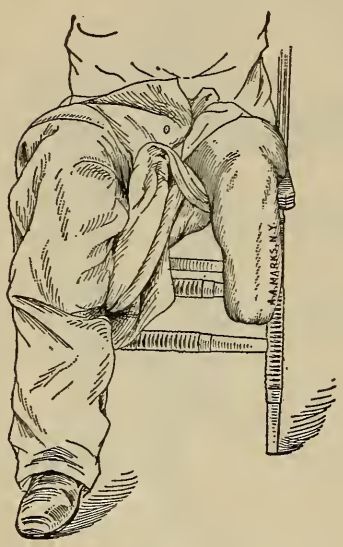
and hip joint contracted to the limit of extension represented in the cut, hip and knee both capable of flexion to the normal point.

Cut 601 represents a stump extending to the calf, extremity very poorly covered; in fact, the tibia protrudes and is only covered by cicatricial tissue.

Cut 602 represents a tibial stump, all conditions favorable.

Cut 603 represents a tibial stump, extending to the lower third of the leg.

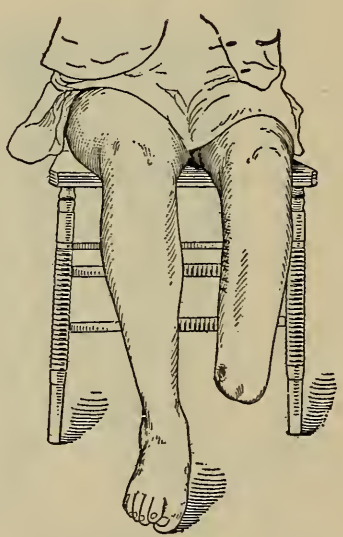
Cuts 604 and 605 represent moderately long tibial stumps.



No. 602.

No. 603.

No. 604.

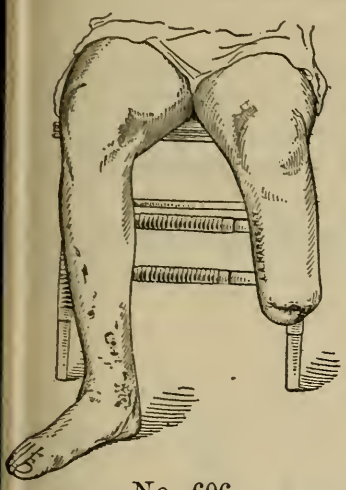


No. 605.

Cuts 606 and 607 represent tibial stumps extending to the ankle or a short distance above the ankle joint.

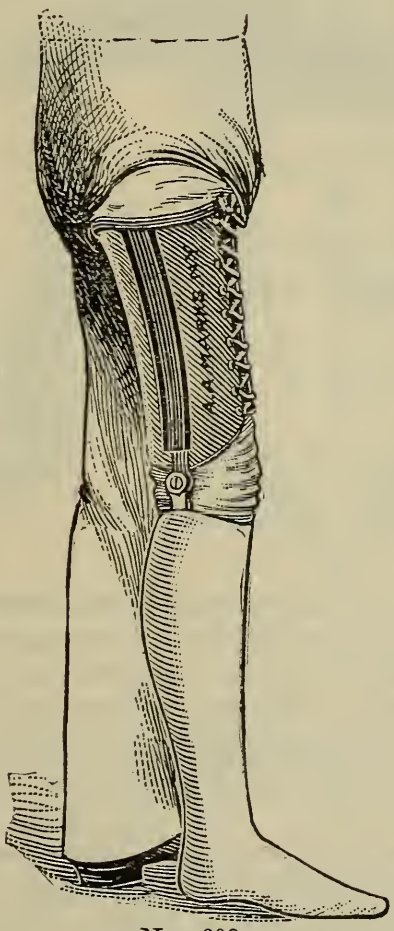
All the above cuts represent stumps that have been fitted with artificial legs constructed upon the plan of No. 589.

The stump, in each case, is inserted in the leg; the thigh portion is laced about the thigh, it is laced sufficiently tight to hold the leg firmly



No. 606.

No. 607.



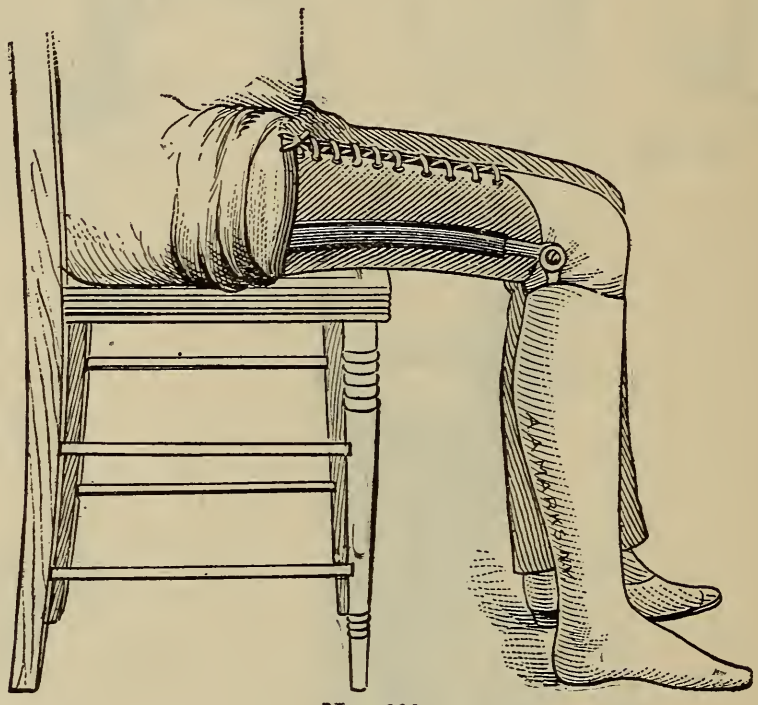
No. 608.

in place, the stump fits the wooden socket comfortably, bearings are admitted only about the enlarging part of the stump immediately

below the knee; the anterior surface of the tibia is always accommodated by a channel; the osseous process of the fibula is provided for by a cavity in the socket; the end of the stump hangs in space and receives no pressure whatever, either on the sides or on the end, except when the conditions of the end of the stump will admit.

In cases of extreme sensitiveness, the weight is carried entirely about the thigh, and the stump from the knee down is not permitted to bear any pressure. In this case, the stump performs no other function than that of directing the lower leg, moving it forward and bringing it backward.

It is rarely the case that weight can be prudently applied to the extremity of a tibial stump; the exceptions are only those stumps



No. 609.

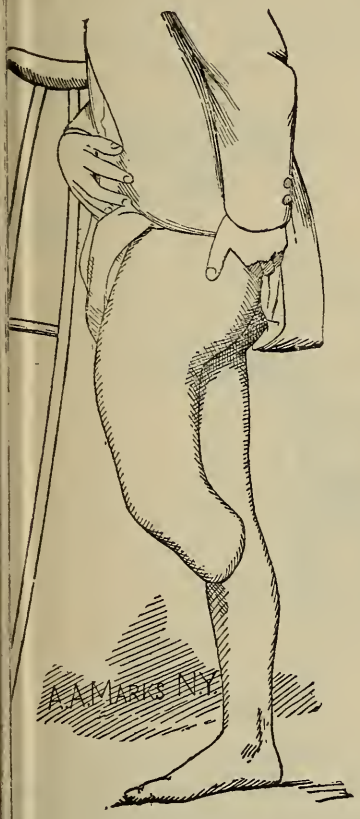
that are protected by periosteal and integumentary tissue, and then only when the cicatrices are well away from the end.

When these favorable conditions exist, we place an end-bearing pad in the socket of the leg. This pad is made to be adjustable so as to increase or diminish the amount of pressure on the extremity.

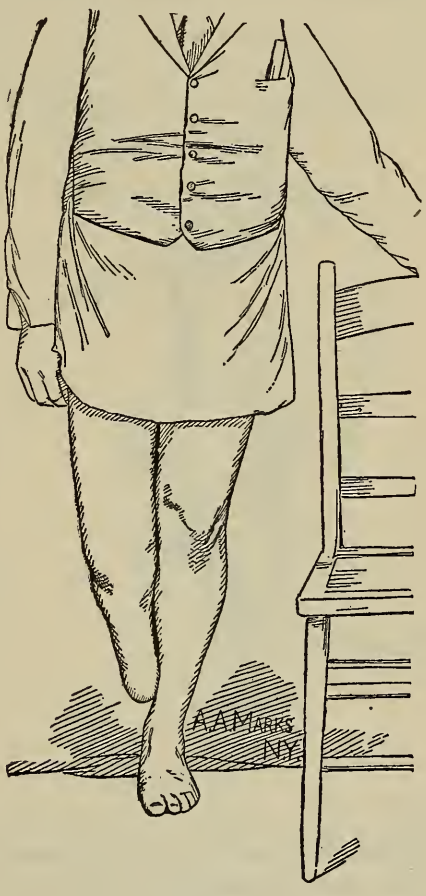
Cut No. 608 represents No. 589 leg applied to a person when standing.

Cut No. 609 represents the same case, but the wearer sitting. When the wearer is dressed, he is able to walk, run, sit, or lie down. Every posture will carry the semblance of nature, every movement will be made with surprising naturalness. The loss of the natural leg is absolutely concealed, and the substitution by the artificial leg restores the wearer to the amplitude of his usefulness.

Cut No. 610 represents an amputation below the knee of the left leg; thigh of the same leg shortened three inches, on account of frac- e of the femur and the lapping of the bone during the process of on. No. 589 leg was applied to this case. The artificial leg from knee down was made three inches longer than the natural leg, in er to compensate for the shortening of the thigh. The leg proved y satisfactory, and enabled the wearer to walk and get about with lity, and without the need of canes or crutches. When seated,



No. 610.



No. 611.

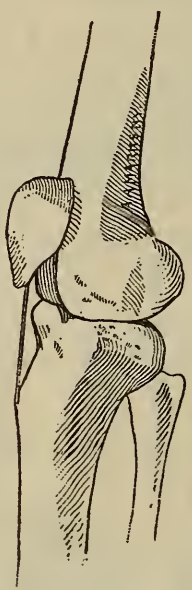
e was a perceptible disparity in the distances from the floor to the of each knee; the right knee being three inches lower than the —a condition that was unavoidable.

ut No. 611 represents an amputation of the right leg below the e. The thigh of the opposite or left leg was fractured, and during process of union became lapped, causing a shortening of several es on that side. An artificial leg constructed upon the plan of No. was applied to this case. The artificial leg was made several es shorter from the knee to the bottom of the foot than the natural This was done to compensate for the shortening of the left h. This necessarily produced a disparity in the distances from the of each foot to the top of each knee—a disparity that was only

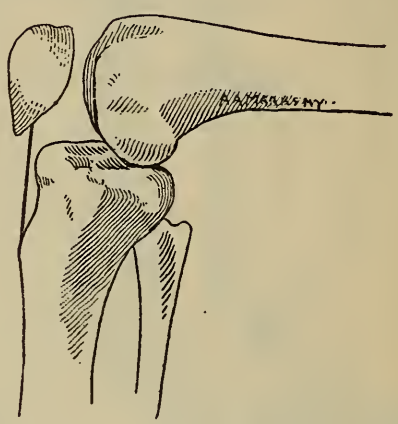
noticeable when the wearer was seated. In other respects there w
no inconveniences experienced in the management of the artificial l

When ordering an artificial leg for a case in which there
occurred a shortening in either thigh, on account of fracture, arres
growth, or hip dislocation, be particular to call our attention to
amount of shortening, as well as its location and its general charac

Sometimes there are conditions that make it impossible to obtain a n
and smooth adjustment about the knee and stump of the No. 589
When the leg is made to adjust smoothly while it is held in extensi
the knee and stump will pull away from the socket when flexed, ca
ing cramping and pinching of the tissues at the back of the stump
the popliteal region, and permitting the top of the socket to form
visible ridge in front, immediately below the knee. This is annoyi



No. 612.



No. 613.

distasteful, and often the cause of suffering. The cause of this co
tion can invariably be traced to some peculiarity in the anatom
arrangement of the knee, usually an abnormal curvature in one
both articulating surfaces of the knee.

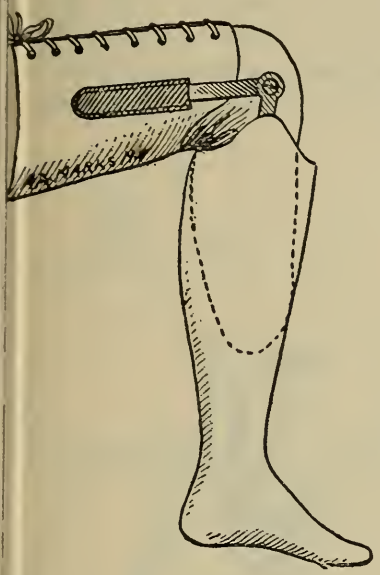
Cut No. 612 represents the bones of the natural knee joint when
knee is extended.

Cut No. 613 represents the same flexed.

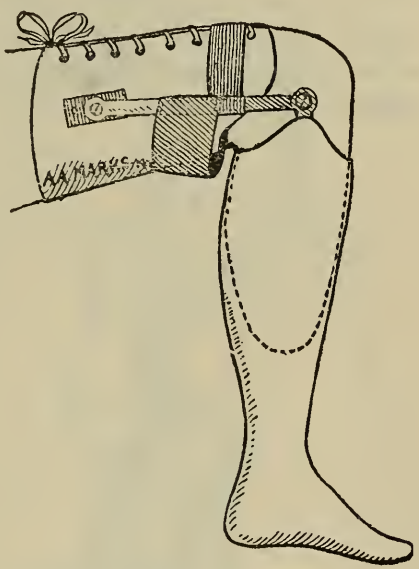
It will be observed that, in passing from extension to flexion,
base of the femur has traveled over the entire bearing surface of
tibia; that the curvature of the articulating surface of the femur is
a regular curve; it is neither elliptical, parabolic, nor volute. The b
ing surface of the tibia is flattened or slightly curved. As these two
faces roll on each other, there is no point that can be located as the ce
of motion. The nearer the articulating surface of the tibia approac
a plane, and the nearer the articulating surface of the femur approac
an arc of a circle, the more uniform will be the motion of the knee;

ien the articulating surfaces of the knee of an amputated leg depart m these conditions, a modification in the mechanism of the artificial ee joint must be introduced in order to make the artificial leg articu- e harmoniously with the natural knee. The duplex knee joint has n invented by us to meet this condition. This joint admits of flexion d extension in polycentric curves.

Cut No. 614 represents the conventional type of artificial leg for ial stump applied to a stump with eccentric knee motion. The shows how the stump, when flexed, is pulled away from the front the socket, and how the tissues are folded under the knee and ched, due entirely to the effort of forcing an eccentric knee to act unison with a unicentric joint. Cut 615 represents the No. 589 leg



No. 614.



No. 615.

th duplex joints applied to a stump with eccentric knee. The result, can be seen in the cut, is that the stump is held in the proper place, eater genuflection is obtained, the cramping at the back of the knee obviated, and the stump is caused to remain close to the socket in nt; the extremity of the tibia is pointed directly downward, instead downward and forward, and is prevented from impinging against e interior anterior front of the socket.

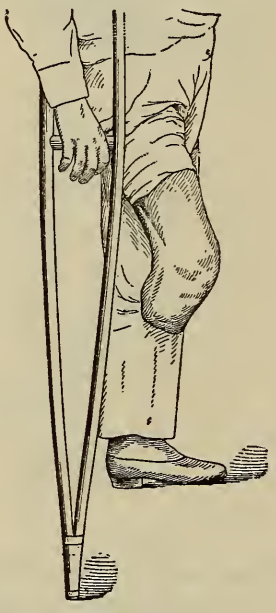
The duplex joint has two centers, one well up on the thigh and the her close to the knee; an independent strap connects the two side rs at the rear; an elastic band passes from one side bar over the front the thigh to the opposite side bar. These straps give firmness to the justments, and at the same time admit of enough oscillation to bring out the desired result, no matter what may be the curvature of otion of the knee.

This duplex joint is protected by letters patent bearing recent date.

CONTRACTED STUMPS.

The fourth class of leg stumps are those that are sufficiently lo below the knee to control the movements of an artificial leg, but are pa tially contracted; extension of the knee somewhat limited—so much as to forbid the use of the ordinary type of No. 589 leg, and not su ficiently contracted to make it necessary to wear a knee-bearing leg.

Cut 616 represents a partially contracted knee of a tibial stump. T stump is capable of full flexion, but extension is limited, as repr sented. Cut 617 represents an artificial leg suitable for such co traction. With this style of leg, the wearer is able to control t movements of the artificial knee by the stump, thus utilizing the moti of the knee to its limit. The artificial leg is fitted while the stump inclined backward, the thigh is incased in the usual manner, and t stump is held to its bearings by means of a leather sheath, which adjusted by lacing. When this leg is applied and dressed, there is apparent irregularity, the lines of the leg are brought to as near t



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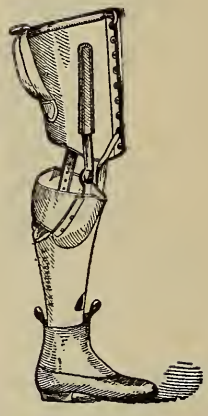


No. 617.

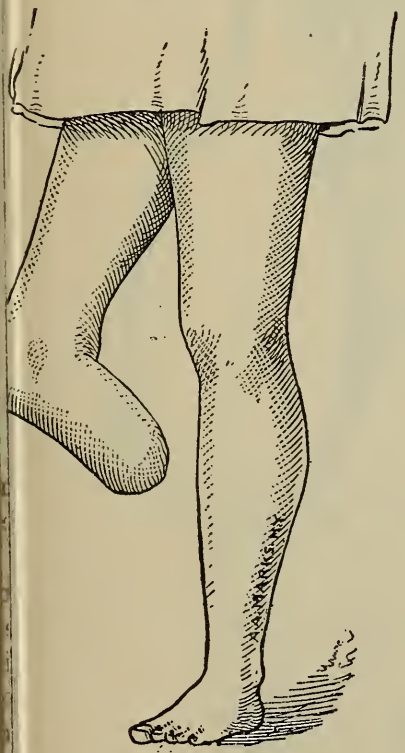
normal lines as possible, and the wearer is capable of walking an standing naturally. The stump rests on a pad, the thickness of whic can be diminished, as improvement in the knee motion may admit.

In almost every case of partially contracted stumps, the gentle, con stant, and painless tension which is brought upon the tendons whe standing and walking, results in breaking up the contraction and i bringing about full knee extension in an incredibly short time. As th tendons relax, the pads on which the stump rests can be diminished When the contraction has entirely disappeared, a new socket can b placed on the leg, accommodating the stump after it has acquired ful knee extension; or, in other words, the No. 617 leg can be converte into the No. 589 type.

Cut 618 represents the leg for contracted stump applied, wearer walking. Cut No. 619 represents the same case, with wearer seated.

No. 618.

No. 619.



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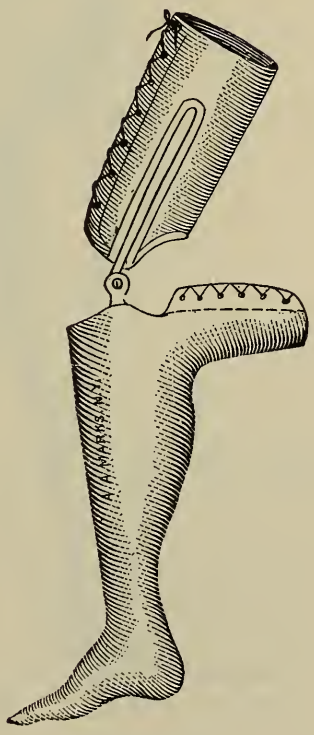


No. 621.

Cut 620 represents a tibial stump, a little more contracted than the e previously considered. Cut 621 represents an artificial leg suitable the case. A knee-bearing leg would at first glance be considered re suitable for this case; but as there is an angular movement

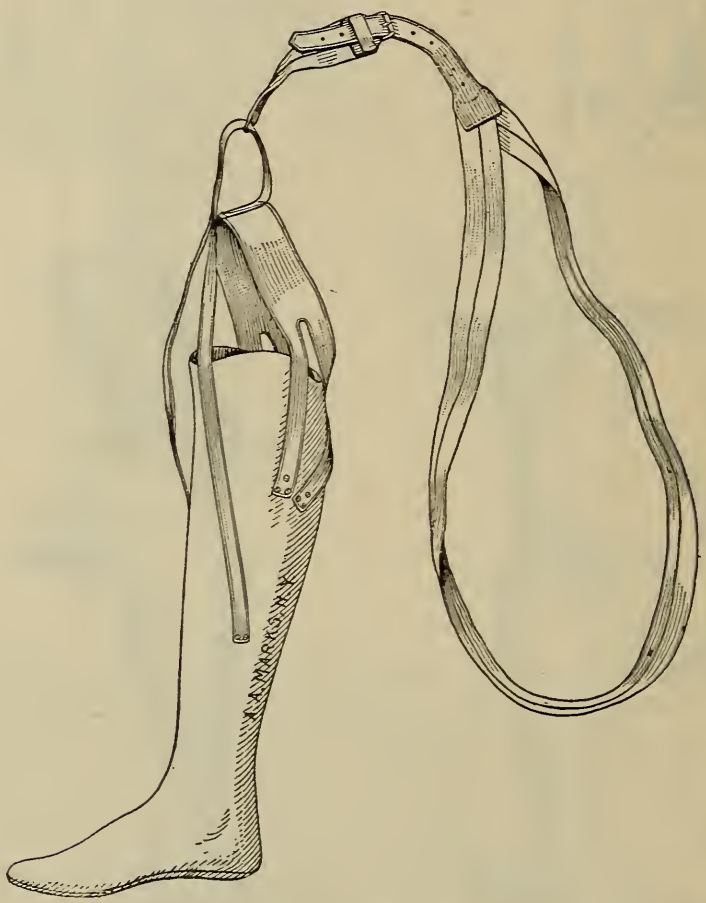
of at least thirty degrees, and a possibility of improvement, it is advisable to subject the tendons to such strains as may force them to relax. The No. 621 leg is calculated to act upon the tendons in a painless manner, and to ultimately reduce the contraction. The shelf in the 621 leg is so constructed that it can be placed in a variety of inclinations to accommodate greater extension when it occurs.

Price for artificial leg for below-knee amputation, whether knee-bearing, contracted, or otherwise, with suspenders and a full line of accessories, $100 each.

Measurements and diagrams required are called for on pages 183 to 188.

ARTIFICIAL LEGS WITHOUT THIGH PARTS.

Artificial legs for tibial stumps are sometimes made without knee-joints or thigh parts, depending entirely upon the sockets for support-



No. 622.

ing the weight of the wearers, and on thigh and shoulder-straps for holding them in position.

Cut No. 622 represents an artificial leg of this type. The socket is made to fit the stump perfectly, taking pressure at admissible places; a band of webbing or leather is buckled about the thigh immediately

above the knee. A number of straps pass downward from the thigh band and are attached to the leg on the sides, on the back, and on the front. Two of the front straps connect with a shoulder-suspender, which supports the leg and assists in its management.

Some manufacturers advocate the use of this type of leg for all long tibial stumps, and contend that the absence of knee joints and thigh parts is desirable, and that without them the muscles of the thigh have greater liberty and the stump is not as likely to become crowded under the knee.

We admit that these reasons are plausible, and that it is an advan-

No. 623.

No. 624.

tage to dispense with pressure about the thigh, and a boon to be rid of the metallic side joints. While we admit these advantages, we feel obliged to impress the fact that the absence of side joints and thigh support entails a great sacrifice of efficiency and subjects the stump to dangerous liabilities. Without thigh support a stump is forced to do all the work, it must withstand strains and contractile forces, and unless the stump is exceptionally strong and healthy, and abundantly protected by tissue flap, it will be constantly threatened with danger. Side joints are calculated to oppose side strains and the thigh part to carry a share of the weight, thereby relieving the stump.

Cut 623 represents a thighless leg applied, the wearer standing, front view. Cut 624 represents the same, rear view. Cut 625 represents the

same, side view, and Cut 626 represents the same with wearer seated. The object of these cuts is to show the operation of the leg, leather band, and shoulder strap when the wearer is standing, walking, or sitting. No matter what position he may be in, there are always some straps that are performing valuable work in holding the leg in place.

When the wearer is standing with his weight on an artificial leg of the above type, the stump has to bear all his weight. This weight is permitted to come on the extremity of the stump only when the con-

No. 625.

No. 626.

ditions will admit; otherwise it comes about the stump immediately below the knee. If the wearer makes a misstep and recovers himself by his artificial leg, the stump will receive a blow. If the wearer carries any heavy weight, his stump will be forced further into the socket, and suffering will follow. If the stump becomes smaller from emaciation, the troubles will be multiplied, pads and wrappings will have to be adjusted with extreme nicety. These facts should be duly regarded before a thighless leg is selected.

We have known of many failures in attempts to wear artificial legs without thigh supports. The tearing of cicatrices, abrasions, excoriations, and general injuries to the stumps so frequently result that we feel impelled by a sense of duty to disparage and discountenance the use of artificial legs for tibial stumps that do not provide for taking some support above the knees.

Those who insist upon wearing thighless artificial legs, who have worn them from choice, and have had their stumps disciplined to their use, will be accommodated without further comment.

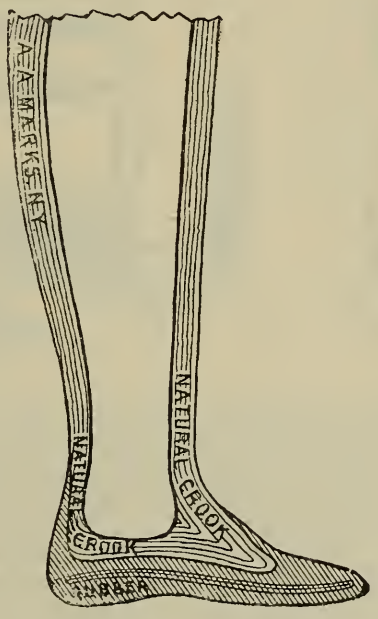
Price of No. 622 leg, with necessary straps and suspenders and a full line of accessories, each $65.

Measurements and diagrams required are called for on pages 183 to 188.

NATURAL-CROOK LEGS.

All artificial legs described in preceding pages are constructed with the leg portions securely attached to rubber feet at the ankles. This method has been in practice for many years, and is found to be satisfactory in the point of strength, neatness, and accommodation, with the exceptions as follows:

First. Long stumps that extend to or near the ankles, and that are very large about their extremities. Such stumps forbid durable con-

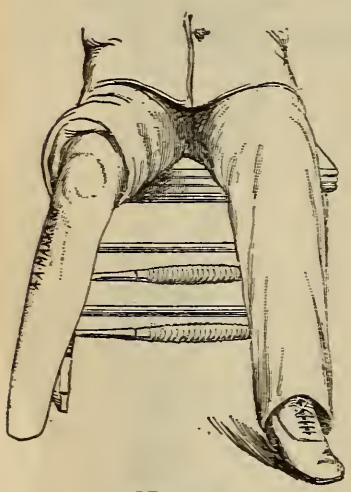


No. 627.

nections of the feet with the sockets. The perspiration will in time destroy the waterproof coating placed on the insides of the legs, and saturate the wood and destroy the fastenings.

Second. Wearers of artificial limbs who follow vocations that subject their artificial limbs to continuous moisture—bridge-builders, oystermen, fishermen, woodsmen, raftsmen, trappers, and hunters. These persons must have artificial legs that are absolutely waterproof.

The only way that we know of by which the two conditions above mentioned can be met, is by making the legs of wood with continuous and unbroken grains, running in the lines of the greatest strains. This is accomplished by carving each leg and core of foot from a natural-crooked piece of timber, and cementing the foot to the core, all of which is properly covered. Cut No. 627 represents a sectional view of a leg made in this manner. It will be seen that there are no mortisings required in this method, there are no pieces of wood connected by means of glue, cement, riveted bands, cords, joints, or other devices; therefore, whatever may exude from the stump can do the leg no damage, and no matter how much or how long the wearer may



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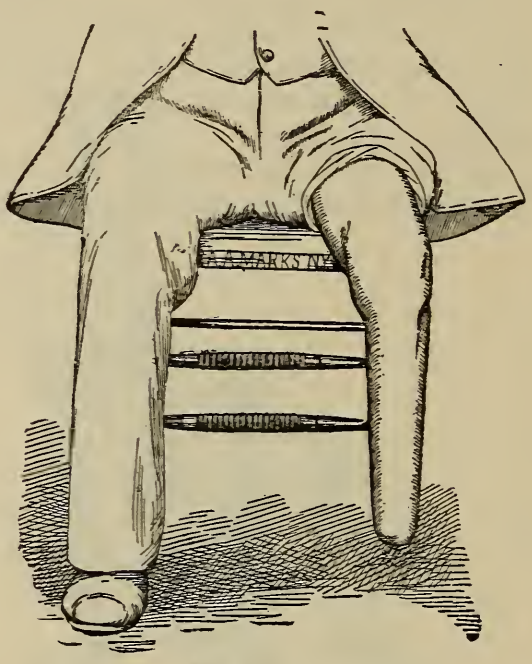


No. 629.

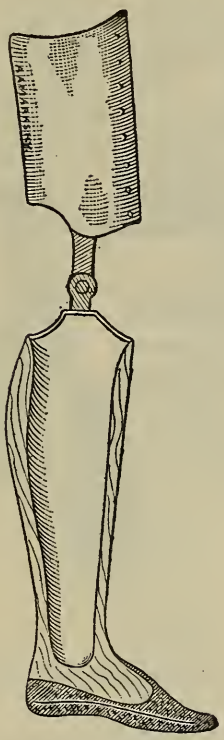
stand in water or expose his leg to moisture, the leg can receive no further damage than that of marring the enamel or loosening the covering; the structural strength remaining unimpaired. This method also admits of the minimum bulk of material surrounding the end of a long and large stump; the diameters of the ankle of the artificial leg are but slightly larger than those of the end of the stump.

Cut 628 represents a long tibial stump extending to the ankle, abnormally large about the extremity, and sensitive on the end. The natural-crook leg is obviously suitable for the case, as it will admit of fittings that will support the wearer, and provide ample room for the extremity of the stump without necessitating the obnoxiously large ankle so conspicuous in other methods.

Cut 629 represents a long tibial stump extending to the ankle, extremely sensitive about the end. The natural-crook leg is especially suitable for this stump, as the fitting can be carried well into the foot, making it impossible for the end of the stump to touch the bottom of the socket.

Cut 630 represents a natural-crook leg with thigh, shown in sectional view. The core of the foot and the body of the leg are approximately at right angles to each other. The lines in the cut represent the grains in the wood. They show that the grains curve with the core and body of the leg, so that there are no cross grains. The cut also shows that the socket can be excavated very deeply and made very large, so as to give ample room for long, large, and irritable stumps.

It has always been an enigma with artificial-limb makers how to construct artificial legs suitable for long and large stumps, and those



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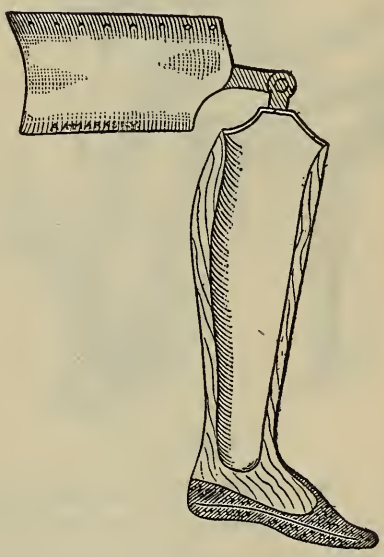


No. 631.

manufacturers who adhere to complicated ankle articulations find it impossible to produce substantial legs for such stumps, as the joints, springs, cords, and metal connections become corroded, stretched, broken, and generally disordered by the destructive exudations of the stump or the exposure to water. The natural-crook leg meets and overcomes all these difficulties, and, when finished, bears the regular appearance of the No. 589 leg.

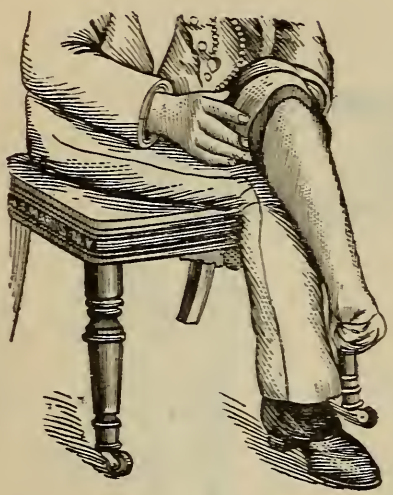
The prices for natural-crook legs are the same as those heretofore described.

The natural-crook feature can be introduced into artificial legs to be worn on thigh stumps, knee-bearing stumps, or any other, and is desirable where the legs are to be exposed to water. The natural-crook feature is protected by United States patents.

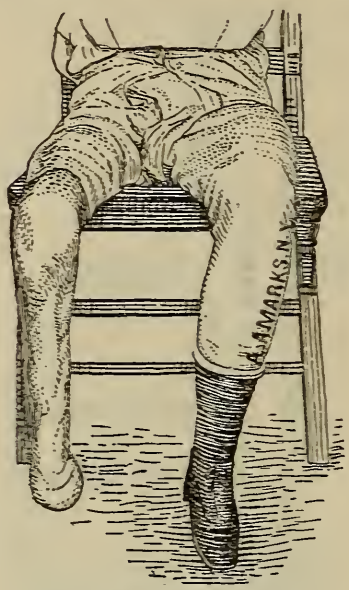
Price, $100 each when knee joints and thigh parts are applied, and $65 each when knee joints and thigh parts are not applied.

ARTIFICIAL LEGS FOR ANKLE-JOINT AMPUTATIONS.

The removal of the foot at the ankle articulation leaves a stump that is capable of excellent prothetic treatment. Such stumps are known among the surgical profession as tibio-tarsal or Syme's stumps, and if the os-calcis is retained and placed at the extremity of the stump, it is termed a Pirogoff's stump. These stumps are prothetically treated under two classes: First, those that can endure weight and pressure



No. 632.



No. 633.

on the extremities, and, second, those that are sensitive on the extremities and forbid the application of weight.

The first class, or those that can bear pressure on the extremities, are usually those that possess the malleoli or ankle bones on the sides of the extremities, and that have nature's coverings on the ends of the bones. The presence of the malleoli is desirable, as they afford means for securing the artificial limbs without necessitating shoulder or thigh attachments.

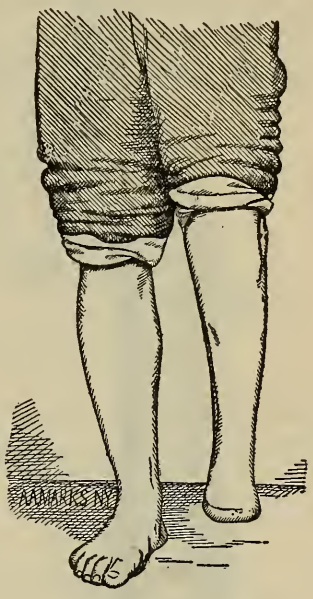
The flap on an end-bearing stump must be integumentary, firm, and healthy, with cicatrices well away from the ends. The stump should be capable of bearing some pressure on the palm of the hand. a test which the patient can apply himself. If the extremity of the stump is covered by cicatricial tissue, or if the end of the stump is too sensitive to endure the pressure of the hand, prudence will demand that an artificial leg be applied that places the weight at other points than on the extremity.

Cut No. 632 represents an end-bearing stump, Syme's operation.

Cut No. 633 represents an end-bearing stump, Pirogoff's operation. It will be seen that the cicatrices in either of these cases are away from the extremities, and all the puckerings of tissue are so disposed as not to interfere with pressure being applied to the ends.

Cut No. 634 represents a tibio-tarsal stump of an unrecognized character. The extremity is covered with flap, and the wearer able to bear weight on the extremity; there appears to be a displacement of flap

No. 634.



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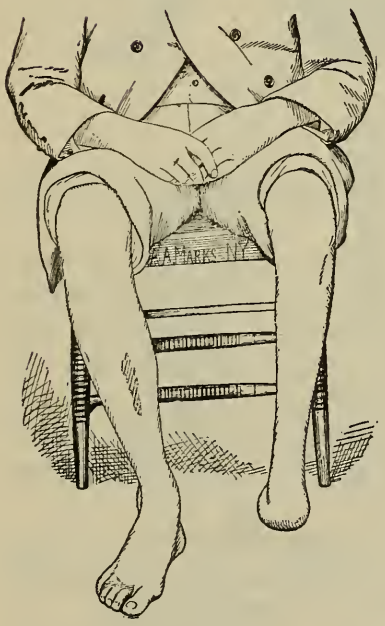

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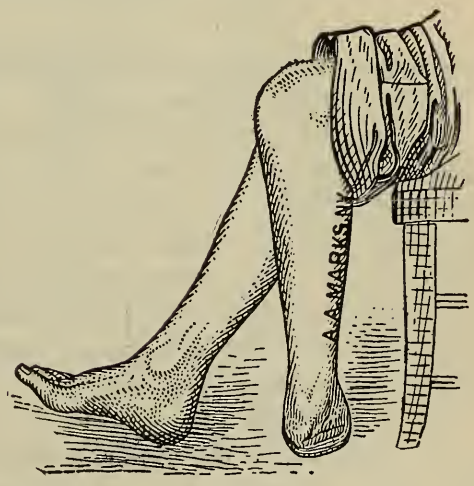


No. 637.

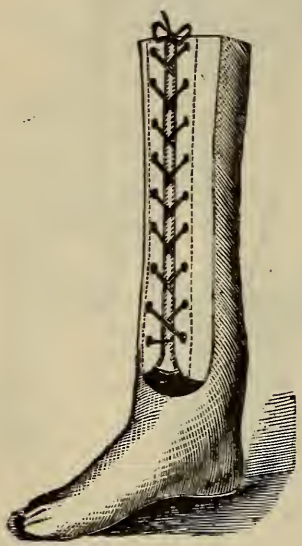
and a lateral cicatrix that passes almost around the extremity. The malleoli have been removed, and the extremity permitted to become larger than the leg immediately above it.

Cut No. 635 represents a model Syme's stump.

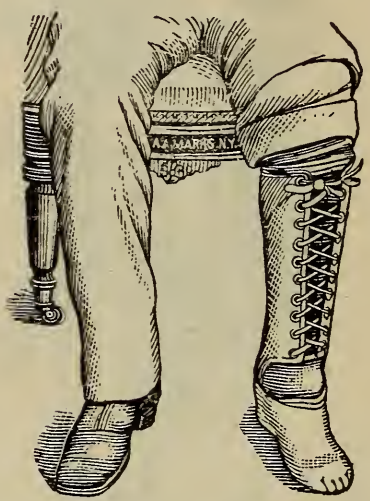
Cut No. 636 represents a tibio-tarsal amputation. The os calcis, instead of becoming united to the tibial extremity, slipped during the healing period and was drawn backward and upward. The stump is an end-bearing one; the displacement of the os calcis does not prevent the application of the usual form of leg for a tibio-tarsal end-bearing stump.

Cut No. 638 represents an artificial leg suitable for a tibio-tarsal stump of the types above referred to.

Cut No. 639 represents the leg applied. The socket of this leg is either carved from a natural-crook wooden block or cast out of



No. 638.



No. 639.

aluminum, according as the conditions of the case demand. The foot is rubber, as described on page 24.

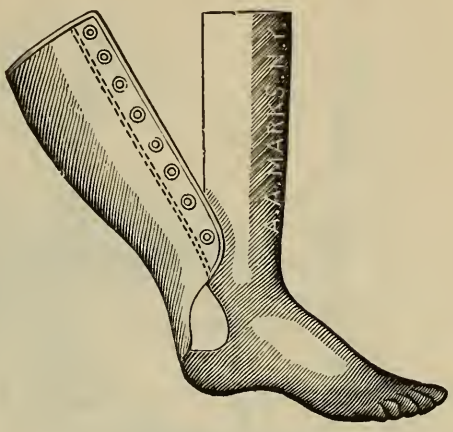
The stump is placed in the socket from the front and is held in place by means of a leather front, laced to fit tightly, as represented in Cut No. 639. When the socket is made of wood, it is covered and enameled. When made of aluminum, the metal is polished and the foot covered. The stump bears on an accommodating pad, which is calculated to receive most of the pressure. The socket is fitted to the sinuosities of the leg and stump, protecting tender places and applying pressure at places of vantage.

If only part of the weight can be borne on the end of the stump, the upper extremity of the socket is made annular and sufficiently long to bear on the tapering part of the leg immediately below the knee.

Cut No. 640 represents a leg of this character. It is obvious that the stump, being inserted from the top, will not enter further than the top of the socket will admit. The pad placed in the bottom of the socket is made in several parts, one placed on the other, and the amount of pressure applied to the end of the stump is regulated by the number of

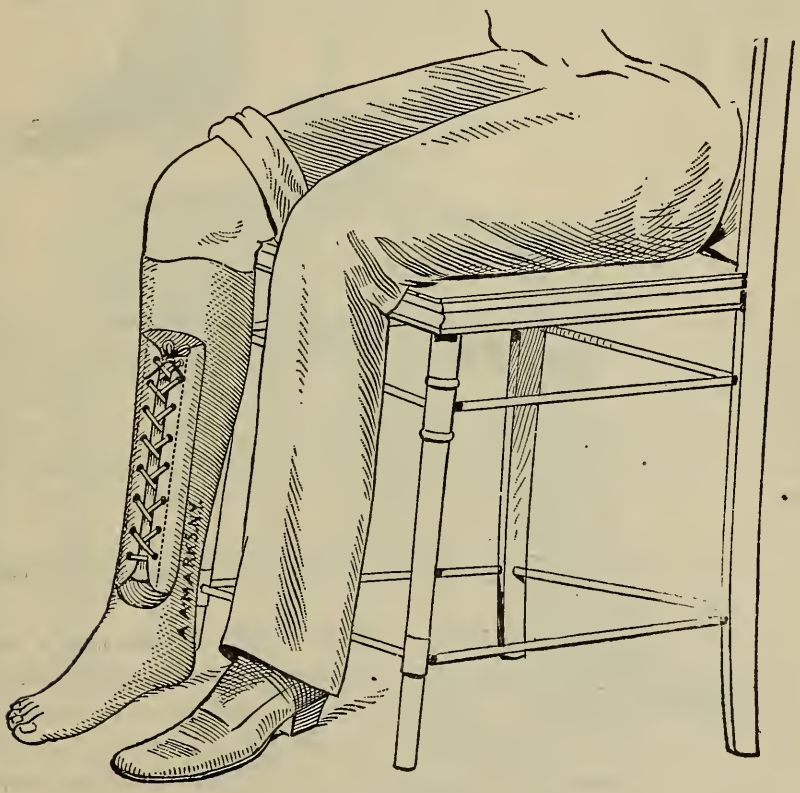
pads in use. Nos. 638 and 640 legs are objected to when applied to stumps that have very large extremities, as the requisite material on

No. 640.



No. 641.

the sides of the sockets increases the diameters of the ankles so as to be objectionable. These legs are also subject to criticism, as they



No. 642.

offer no protection to sharp or sensitive shins. In order to obviate these objections, style No. 641 leg has been devised, and has become a

L of C.

great favorite. This leg is constructed with socket of aluminum and foot of rubber. The foot is covered with suitable leather, and the socket is polished exteriorly and lined interiorly with sweat-proof

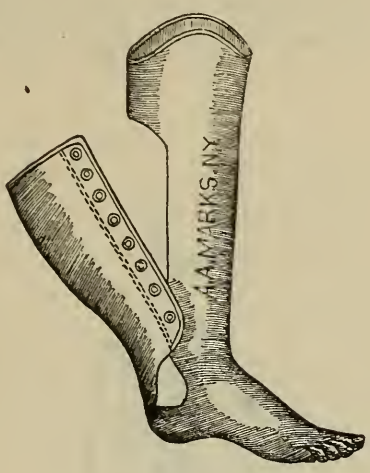
No. 643.

felt. The stump is placed in the socket from the rear, a leather sheath passes from the rear, encasing the stump and shell, and lacing over the aluminum front. The aluminum about the sides of the ankle is thin and does not objectionably increase the diameters of the ankle; the socket protects the shin bone, and the end of the stump rests upon pads that can be increased or diminished in thickness to suit the requirements.

Cut No. 642 represents leg No. 640 applied, and Cut No. 643 represents leg No. 641 applied.

No. 641 leg has many advantages over No. 638. It provides a neat, unbroken front, dresses naturally, and possesses every requirement for easy, comfortable, and natural walking. The strain is carried from the front of the foot up to the front socket of the leg, and as the front line of the socket is about over the middle of the foot, the strain resulting from rising on the ball of the foot is minimized. In the No. 638 leg the strain is carried from the ball of the foot to the rear of the leg. As this distance is considerable, the material at the side of the ankle must be quite thick in order to possess the necessary strength. As

these conditions are reversed in the No. 641 style, the amount of material necessary for structural strength is considerably less, and con-



No. 644.

sequently the No. 641 leg can be made much lighter and possess the same strength.

A stump that is incapable of bearing the entire pressure on its

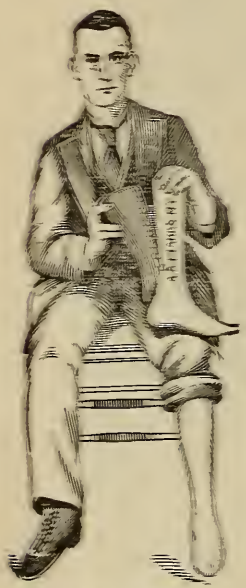
No. 645.

extremity can be provided with a leg, the upper portion of which is made annular, as represented in Cut No. 644. The annular top will support the weight immediately below the knee. The pads for the

ends of the stump to rest on are composed of several layers, so as to admit of change to receive its proportion of weight.

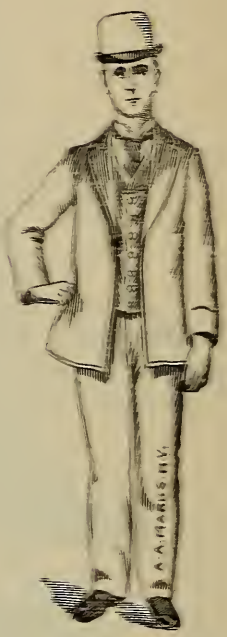
Cut No. 645 represents No. 644 leg applied.

Cut No. 646 represents a tibio-tarsal stump and a leg suitable for the same. Cut No. 647 represents the same with leg applied, and Cut No. 648 represents the same case with both legs properly dressed; the loss



No. 646.

No. 647.



No. 648.

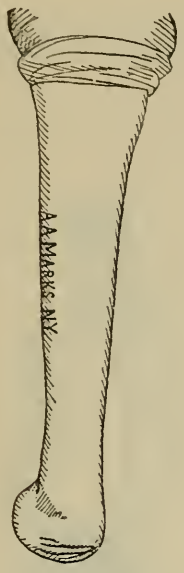
of foot is entirely concealed, and the wearer is restored to his ability to walk, run, or work.

The second class of tibio-tarsal stumps are those that cannot bear pressure or weight on the extremities, due to imperfect healing, sloughing, or other causes. Stumps of this class can always have artificial legs applied. The legs will prove helpful and advantageous, and can be so adapted as to protect the tender extremities from pressure, and to apply the bearings and take weight at places above and distant from the extremities.

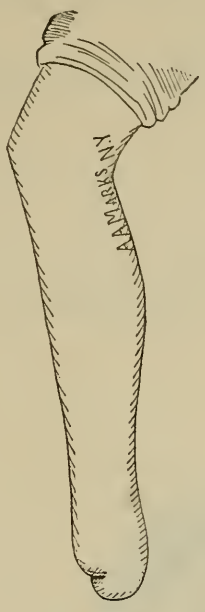
Cut No. 649 represents a characteristic non-end-bearing tibio-tarsal stump. The flap has been drawn to one side, and the cicatrix brought over the end of the stump, thus forbidding end contact.

Cut No. 650 represents a tibio-tarsal stump in which a tender cicatrix passes laterally across the extremity. Cut No. 651 represents a stump in which the extremity is covered by cicatricial tissue only. Cut No. 644 represents the style of leg that can generally be applied to amputations of the above types. The annular top takes pressure immedi-

ately below the knee, and keeps the extremity from coming in contact with any surface. Occasionally additional assistance is necessary



No. 649.



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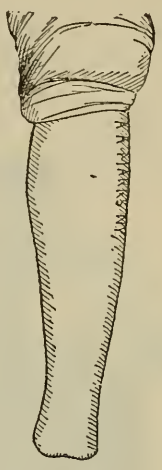
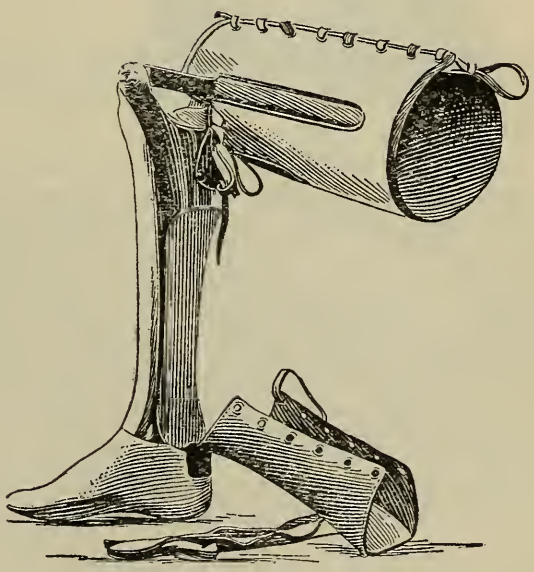


No. 651.

to accommodate a stump that will not admit of pressure being applied immediately below the knee. When the occasion occurs, we com-

No. 652.



No. 653.

bine knee joints and thigh parts, as represented in Fig. No. 652. The lower section of this leg is constructed of wood or aluminum, as may

be preferred. A rubber foot is attached to the extremity; a leather sheath passes from the rear to the front, which holds the stump in place. Side knee joints, connecting the thigh parts with the lower leg, support the weight of the body.

Cut No. 653 represents the leg flexed; the thigh supporter distributes

No. 654.

No. 655.

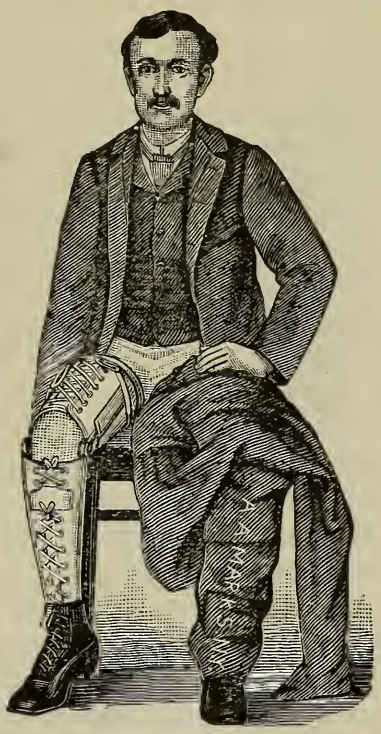
weight and pressure over a very large area, and in so doing not only relieves the stump, but renders the artificial limb more pleasant and tolerable.

Side joints and thigh supporters may be considered absolutely necessary and indispensable when limbs are to be worn on irritable or sensitive stumps, or those that are poorly nourished or of impaired vitality; such stumps must have as little interference with the circulation as possible. The amputation of feet for frostbite, gangrene, or any malignant disease produces stumps that must be regarded as coming under this class, and should be treated in the manner above indicated.

Cut No. 654 represents a double tibio-tarsal amputation; extremities incapable of bearing pressure, and the legs to the knees sensitive, forbidding pressure or any interference with circulation. Cut No. 655 represents a pair of suitable artificial legs applied. The nutrient vessels located in the stumps and about the knees rebel against any pressure. The treatment of this case in the manner indicated was highly successful, and the subject was brought to realize results that were far more gratifying than he had hoped for.

Cut No. 656 represents a stump extending to a point very close to the ankle, the extremity poorly protected and incapable of bearing pressure. The most unfortunate condition of this stump was the presence of a scale of necrosed bone located on the anterior aspect of the tibia, about four inches below the knee. The scale was partly exposed, and surrounded by sensitive tissue. It was evident that no pressure could be applied to the end of the stump or about the diseased scale; the bearing surfaces were limited to a very small area immediately below the knee and above the diseased bone. An artificial leg that was especially adapted to the case was applied as represented in Cut No. 657. No pressure or rubbing was allowed about the diseased

No. 656.



No. 657.

parts; all the weight was taken immediately below the knee and about the thigh. The case was successful in every respect.

The importance of avoiding any pressure about the popliteal region, especially of long stumps, which require more nutrition than short ones, cannot be overestimated. If pressure is permitted to come on the vascular part of a long stump, strangulation will follow. This must be guarded against at all hazards, and extreme caution must be exercised to obviate such an unfortunate error. The necessity of applying side joints and thigh supports to all artificial legs to be worn on long and doubtful stumps is apparent.

An important feature, that should not be overlooked, is the fact that in artificial legs heretofore described there are no metallic connections, such as hinges, joints, or springs, nor any connecting parts, such as cords, bolts, or rods, to prevent the appropriation of ample room for

the accommodation of the enlarged extremity of a long stump. The presence of the rubber foot, with spring heel and yielding toe, provides every requisite for easy, lifelike, and noiseless walking, without resorting to complicated connections, and without necessarily elevating the wearer two or three inches in order to obtain space for the accommodation of articulating parts.

ARTIFICIAL LEGS FOR PARTIAL FEET AMPUTATIONS.

Partial feet amputations are characterized by the surgical profession as tarso-metatarsal, or medio-tarsal, and are frequently designated by the names of the surgeons who first performed the operations; as, for example, Chopart, Lisfranc, Heys, Hancock, and countless others.

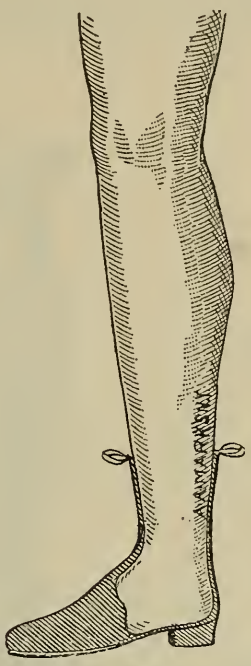
These amputations are performed for the purpose of removing diseased or crushed parts and sacrificing as little of the foot as possible, retaining the heel and a part of the foot for the purpose of enabling the subject to walk or stand on the remaining plantar surface without recourse to prothetical appliances. Although this may to all appearances be accomplished, it is not long before the subject discovers that his locomotion is greatly impeded by the absence of the front of a foot. He may pack the front of his shoe with cotton, cork, or other material, and may re-enforce the sole of his shoe by a steel plate, but he soon finds that these means provide but partial relief, and that the demand for some appliance that will enable him to rise on the ball of the foot and elevate his heel from the ground is imperative, and that there must be rigidity and great strength in the connection of the attached parts to his leg, especially if he is a laboring man.

The construction of artificial feet for this class of amputations has perplexed artificial limb-makers for a great many years, and at the present time there are but few manufacturers who care to have anything to do with the supplying of artificial feet for partial feet amputations. Some makers get up makeshifts which prove to be nothing more or less than artistic and neat forms of stuffed shoes that conceal the loss, but fail to supply the assistance that is needed. The absence of space between the end of the stump and the floor presented an insurmountable obstacle to the construction of a helpful and durable appliance until aluminum was employed.

Cut No. 658 represents a stump resulting from a partial foot amputation. Cut No. 659 represents the manner in which the amputation is prothetically treated by most manufacturers. This foot is constructed of a leather shoe, which incloses the remaining portion of the foot and part of the ankle; a wood or rubber front of foot is placed in this shoe, a metal plate passing along the bottom of the foot from the heel to the toes. While this appliance restores a natural appearance to the amputated member, it fails in supporting the wearer in a substantial manner. After a brief period the stump will crowd forward, causing unpleasant contact with the appliance; the foot, too, will bend at the

end of the stump and fail to give the required phalangeal support, and, on account of the liberty this system gives, the heel of the amputated foot will yield to the forces of the tendo-Achilles and become displaced. All these conditions are unfortunate and invariably bring disappointment. Cut No. 660 represents another ill-advised method of providing an appliance for a partially amputated foot. This appliance is constructed in the following manner: A sheet of metal is hammered to an accommodating shape to receive the remaining

No. 658.



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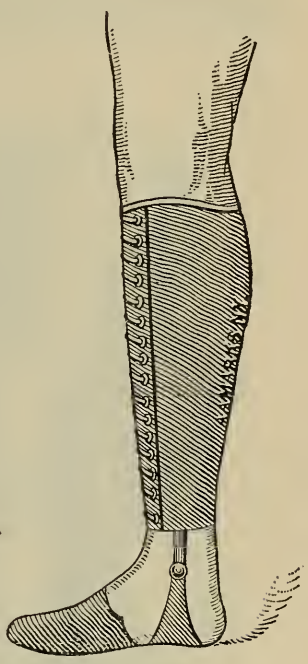
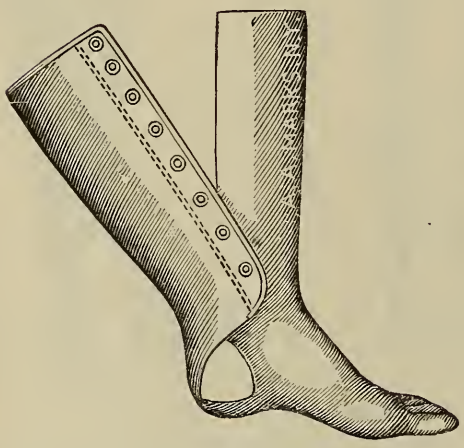


No. 660.

plantar surface of the foot; it is bent up on either side to provide a joint to admit of ankle articulation; the upper parts of these joints extend up the sides of the leg, and are held in position by leather corset passing around the calf. The front portion of the metal sole is connected to a part of a foot; this device is calculated to supply the deficiency, but sadly fails in its mission. The artificial leg is not held to the stump with that firmness that will admit of phalangeal support, and the insecure way in which the stump proper is held to the plate admits of more or less moving of the stump on the plate; this will produce chafing and will keep a tender stump in a constant state of irritation. Some manufacturers of the No. 660 plan attach a heel cord to the back of the metal sole, and run the heel cord up the back of the appliance, connecting the sole with the upper ends of the metal joints. It is not long, however, before the heel cord becomes stretched and inoperative; when newly put on, it fails to hold the foot firmly to the stump and arrest ankle articulation at the proper angle, to provide phalangeal support, or to prevent the amputated surface of the stump inclining downward and coming in contact with the metal sole or with the front part of the foot. A

glance will show that either of the above mentioned legs (No. 659 or No. 660) must prove inadequate. When weight is applied to the ball of the foot, the heel of the artificial part will remain on the ground while the heel of the stump will lift away. The wearer will walk flat-footed and will frequently press the delicate amputated surface against the hard, resistant part of the attachment. These conditions will not only defeat the object of the artificial foot, but produce unpleasant results and much suffering.

It may appear to some that a part of an artificial foot might be lashed to the remaining part of the natural foot sufficiently firm to



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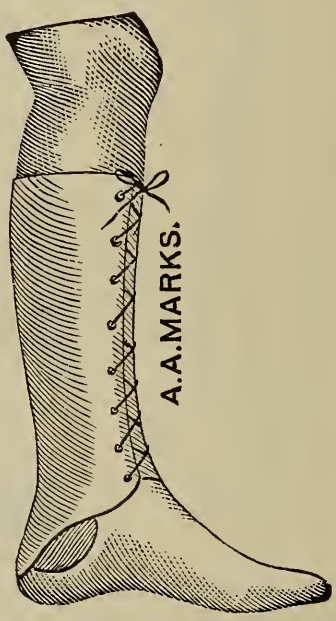


No. 662.

enable the wearer to rise on the ball of the attached part. If this were possible, the method of treatment would be greatly simplified; but, unfortunately, compression of the natural heel benumbs the foot and cannot be tolerated.

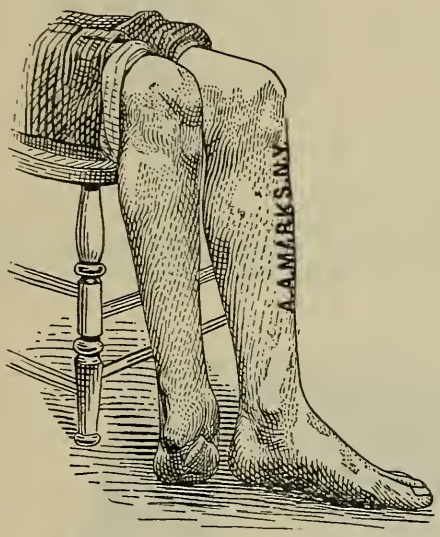
We desire to emphasize the fact that it is absolutely useless to apply any form of foot to a partial foot stump unless the artificial part is held sufficiently firm to enable the wearer to rise on the ball of the foot, and not only support his weight while in that position, but support such additional weight and resist such additional strains as his habits in life or occupation may require.

The only successful scheme that we know of for meeting the demands for comfort, utility, efficiency, and durability consists in forming a shell of aluminum so that it will surround the front longitudinal half of the leg and remaining portion of the foot, thus providing a metatarsal body to which rubber toes can be attached. This shell is held firmly to the leg by means of a leather sheath, which holds the

artificial part firmly to the natural, and distributes all the weight and strains over a large area of the leg below the knee.

Cut No. 661 represents an artificial leg constructed on the plan above indicated. Cut No. 662 represents the same applied. The bearings in this limb are made comfortable by being properly fitted and lined with felt. The felt is attached to the aluminum by a sweat-proof cement. The bottom of the foot and the toes are of sponge rubber and provide a yielding, noiseless, and pleasant medium to walk and rise upon, at the same time producing results that closely imitate nature.

The aluminum shell passing in front of the leg is especially desirable, as it protects the shin bone from any contact and applies the strain



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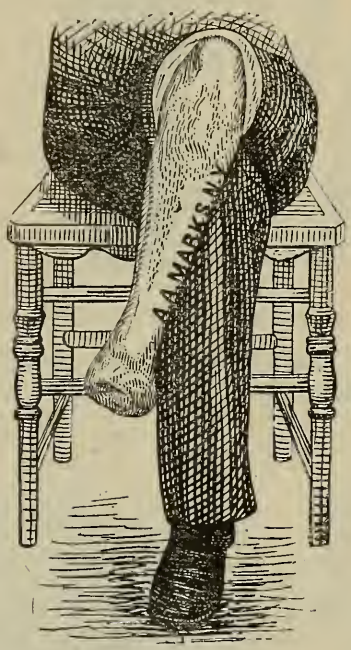


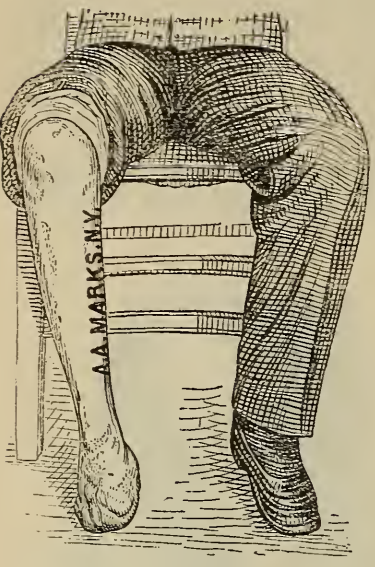
No. 664.

resulting from phalangeal resistance in the most direct manner. The leather sheath attached to the back of the leg is made to possess the shape of the calf of the natural leg. Where there is a tendency for the tendo Achillis to contract, the leather sheath is re-enforced with a metal form that holds the heel down in its proper place, thus counteracting the contracting tendency of the tendon. These artificial parts are so attached that they can be worn without inconvenience or suffering. The wearers walk naturally, striking the heel first, then rising on the ball of the foot; they are enabled to carry heavy burdens without endangering their stumps or producing painful contact. This method of treating partial feet stumps has the additional merit of not elongating the amputated side perceptibly.

Cut No. 663 represents an anomalous partial foot amputation; the cicatrices are well away from the end and in front, the heel remaining and capable of bearing weight.

Cut No. 664 represents a typical Chopart's amputation.

Cut No. 665 represents a typical Lisfranc's amputation.
Cut No. 666 represents a Hancock's amputation of part of foot.

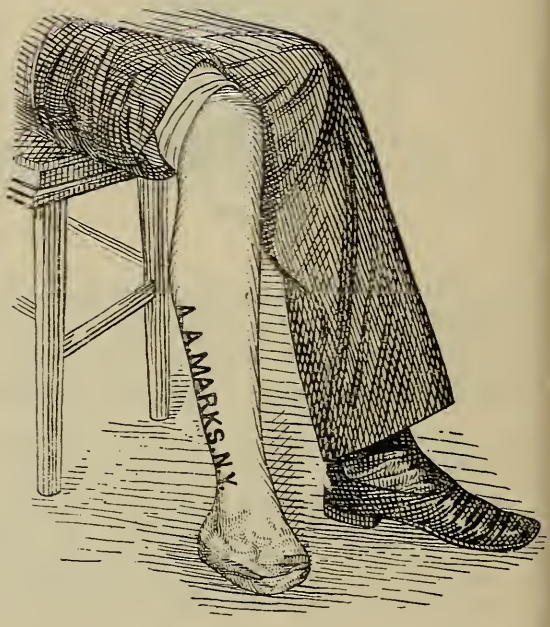


No. 665.

No. 666.

The cicatrix well away from the front ; the amputated surface well covered.

No. 667.

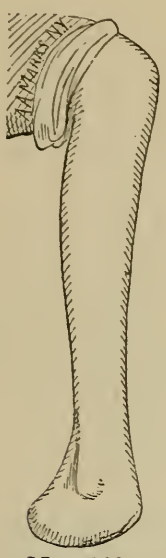


No. 668.

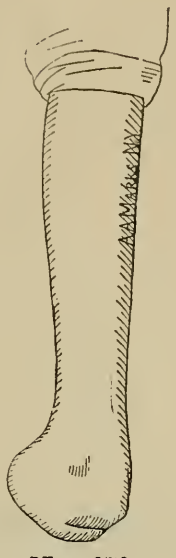
Cut No. 667 represents a Chopart's amputation, the remaining plantar surface unimpaired.

Cut No. 668 represents the amputation of a front part of foot a little back of the toes.

Cut No. 669 represents a Chopart's amputation, with a slightly contracted tendo Achillis, a condition that is frequently met with in par-



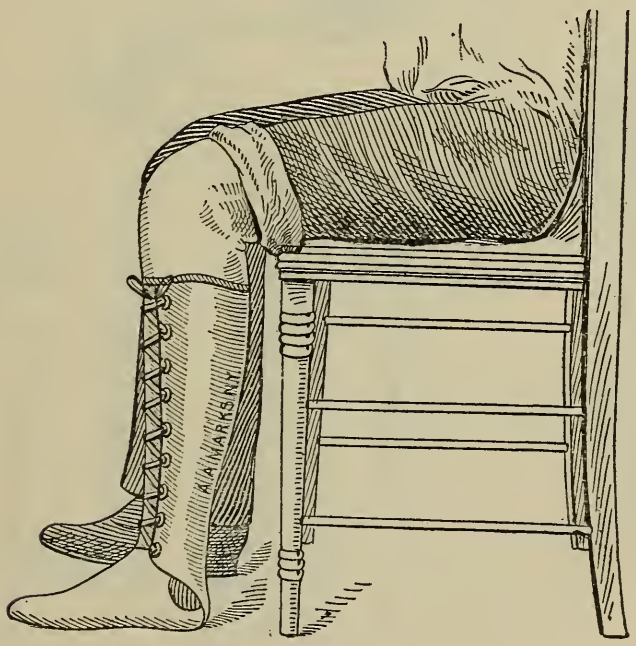
No. 669.



No. 670.

tial foot amputations, especially when the amputations are made above the insertion of the flexors.

Cut No. 670 represents a similar case. Although these cases of con-



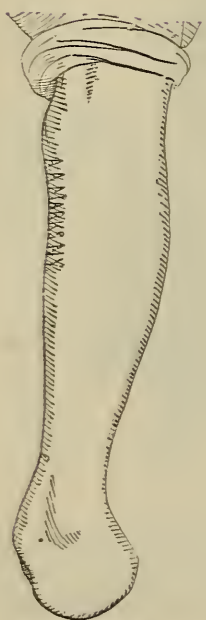
No. 671.

tracted tendons are unfortunate, they do not necessarily remove all hope of successful prothetic treatment. Style No. 661 leg can, as a general thing, be applied or so modified as to meet the conditions very successfully.

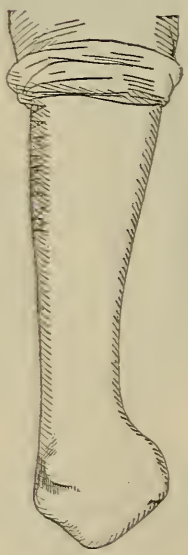
Cut No. 671 represents an artificial leg applied to a partial foot amputation, the wearer seated.

Cut No. 672 represents the leg applied and the wearer walking. Cuts Nos. 673, 674, and 675 represent partial feet amputations; the

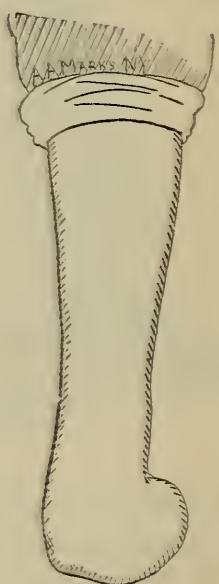
No. 672.



No. 673.



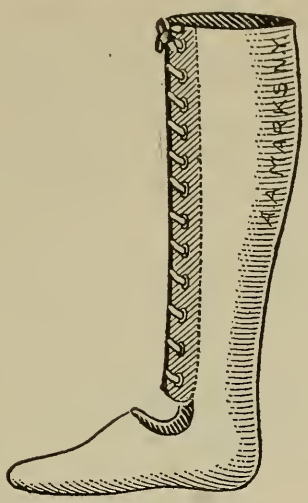
No. 674.



No. 675.

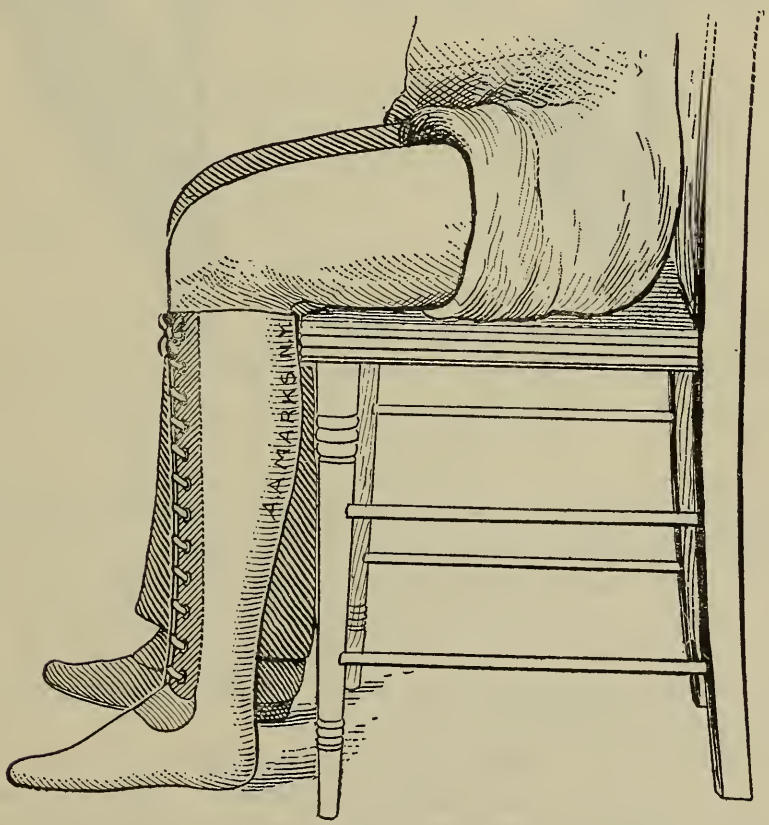
contraction of the tendo Achillis has been so great as to draw the remaining portions of the tarsus entirely out of their places. An

artificial leg suitable for either of these cases must encase the rear longitudinal half of the leg and foot with aluminum, and have the



No. 676.

lacing part in front. This method admits of closer fitting about the sides, top, and bottom of the displaced heel, and holds that part



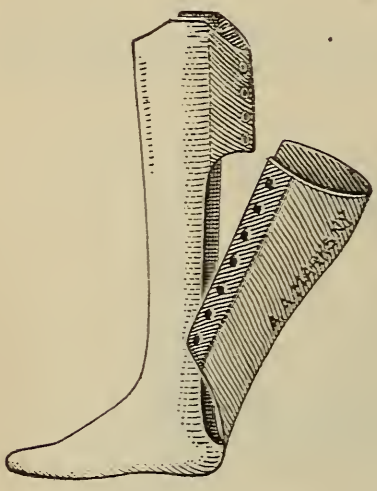
No. 677.

firmly in place, although it necessarily enlarges the diameters about the foot.

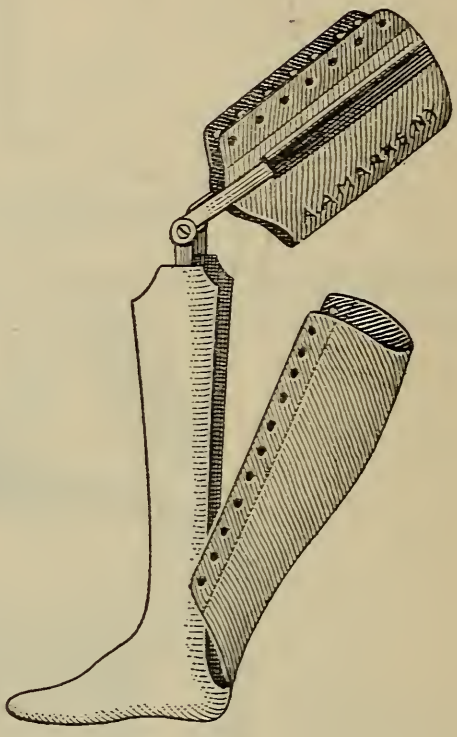
Cut No. 676 represents a leg of this kind, and Cut No. 677 represents the same applied. We do not regard this style of leg desirable from

an ornamental point of view, and only apply it when the conditions of the case demand.

In partial foot amputations, where the remaining heel has been so greatly drawn out of place by the contraction of the tendo Achillis as to place the amputated surface directly on the extremity of the stump, the artificial parts must be so applied as to permit no pressure whatever to come upon the extremities. An annular top applied to style No 661 or No. 676 leg will sometimes meet this condition, but occasion-



No. 678.



No. 679.

ally the condition has to be met by means of side joints and thigh part, applying weight and pressure above the knee.

Cut No. 678 represents the annular top applied to style No. 661 leg. This annular top is made of leather, formed to proper shape and made very resistant. It can be opened at the back so as to admit the large end, after which the leather is laced firmly together and weight carried about the leg immediately below the knee.

Cut No. 679 represents a leg, with knee joints and thigh support, for partial foot amputation, non-end-bearing stump. The lower section of this leg is made of aluminum, and encases the front longitudinal part of the leg. The rear is encased by a leather sheath which covers the aluminum shell. When in use the wearer stands on the artificial foot and his weight is applied to his thigh instead of about the leg or on the end of the stump.

The use of aluminum in the construction of an artificial leg for a

partial foot amputation is especially advantageous, as the metal will admit of being worked to a shell of very slight thickness, thus adding imperceptibly to the diameters of the large stump it encases. The metal is strong and light, and is capable of being worked in any accommodating form. The thickness of material under the extremity of a partial foot amputation need not be greater than one-eighth of an inch to possess the requisite strength.

The utilization of aluminum in the construction of artificial legs must be limited to legs designed for long stumps with large extremities, such as partial foot- and ankle-joint amputations, as the necessity for adding as little bulk of material about the extremities of such stumps is most important. When wood is used instead of aluminum, the case that surrounds the end of the large stump must be at least one-half an inch in thickness on each side of the stump. This adds one inch to the diameters of the stump, and makes the leg conspicuous and objectionable.

During the past few years we have made many experiments, aiming at the general application of aluminum in the construction of artificial limbs, but we regret to say that thus far we have received but little encouragement. Aluminum socket legs for ordinary thigh or leg stumps are objectionable on account of their weight and their conductivity of heat and cold.

The characteristics of aluminum are its low specific gravity, its great comparative strength, and its non-corrosibility. Its weight is the least of all metals (one-quarter that of silver). Its strength is much greater than wood, and comparable with copper. It will not corrode when exposed to fresh water or to a moist atmosphere. We desire, however, to correct the impression that many persons have of this metal. We have often heard the remark that aluminum is lighter than cork and stronger than steel. These are the statements of ignorant persons, and are very wide of the facts. Aluminum will sink when put in water, cork and wood will float; and although aluminum is strong, it has but a fractional part of the strength of steel. The utilization of aluminum is narrowed down to sockets for long and large stumps. We hold United States patents on artificial limbs of all descriptions with aluminum sockets, and if we could make good use of that metal for general purposes we would unhesitatingly do so.

ARTIFICIAL TOES.

The amputation of one or more toes from the foot interferes but slightly with standing and walking. If the healing has been complete, and the amputated surface well cushioned with integumentary tissue, a wad of cotton or any flexible form placed in the front of the shoe will answer every purpose, but if there are prominent bones, tender points, delicate spots, or irritable surfaces on or about the

extremity, a form of shield will be required that will protect those places and guard them against the encroachments of the shoe.

Cut No. 680 represents a foot with the phalanges removed: amputation immediately back of the toes; the amputated surfaces very delicate, demanding a protecting sheath.

Cut No. 681 represents a sheath for the same, and Cut No. 682 represents the sheath applied. This appliance is made of wood or aluminum, as may be more suitable. It is shaped to receive the foot

No. 680.

No. 681.

No. 682.

in a comfortable manner. Tender points in the region of the amputated surface are provided with recesses that prevent contact. The appliance when strapped in place is covered with an ordinary shoe.

Cut No. 683 represents a foot with the great toe removed. The extremity very tender, demanding protection.

Cut No. 684 represents an appliance suitable for the case.

Cut No. 685 represents the same applied. The sole is so formed as to

No. 683.

No. 684.

No. 685.

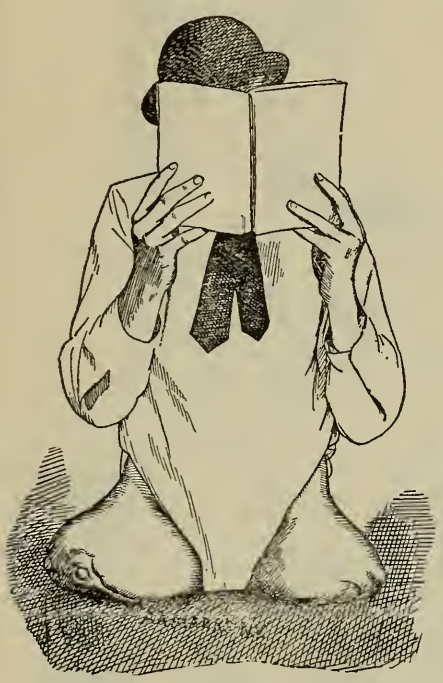
distribute pressure over the plantar surface of the foot, providing recesses for the tender spots, thus preventing those spots from touching any part of the appliance, or of the shoe, no matter what position the wearer may be placed in, either walking, standing, or sitting.

Appliances above described should not be used except when there are tender parts of the foot that require protection; they neither restore the needed parts nor improve the appearance; in most cases they increase the dimensions of the foot, and are sometimes objected to on that ground.

Price for appliance, $30.00 to $50.00 each, according to conditions.

ARTIFICIAL LEGS FOR DOUBLE AMPUTATIONS.

No matter how greatly a person may be dismembered, prothetic science is capable of rescuing him from a life of helplessness. A few years ago it was considered rash to apply a pair of artificial legs to a person who had lost both of his natural legs above the knees. Attempts to substitute such a large portion of the body depending on short thigh stumps for support resulted in failures, and until modern ideas were introduced and appropriate means for attachments were devised, failure followed every effort. According to records, in 1864 the first



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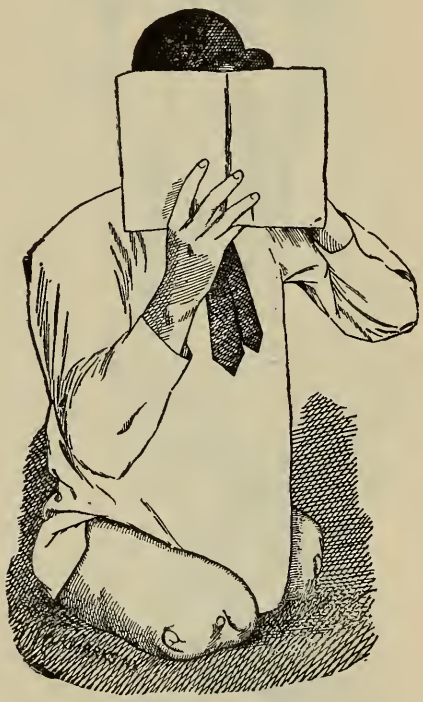
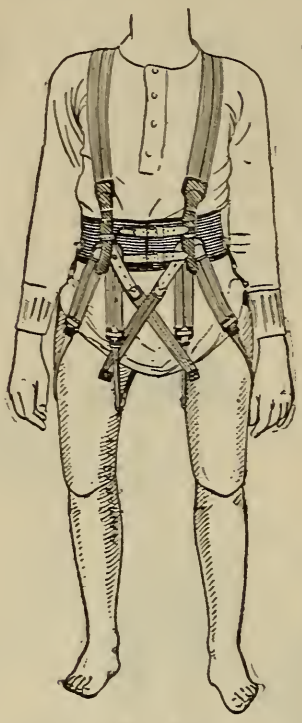


No. 687.

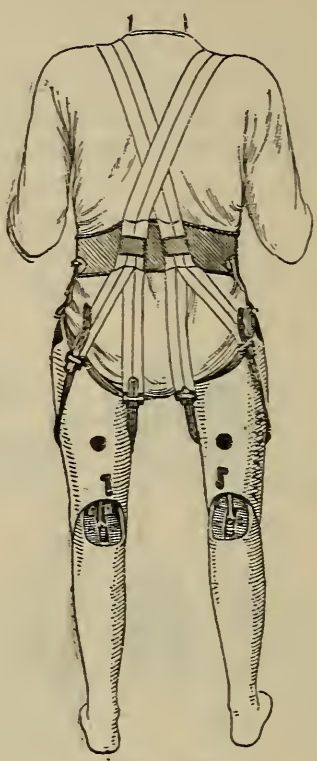
pair of artificial legs were applied to double thigh amputations, and those were applied by A. A. Marks to a subject of the Civil War. Although the subject was able to stand and walk on his artificial legs, the effort required to walk was so great that the wearer soon tired of them and abandoned their use, and became the occupant of a wheel chair, entirely dependent on his family during the rest of his life.

In 1879 Mr. Marks made his second attempt, and succeeded admirably. The subject was a young man with two thigh stumps that reached nearly to the knees. This man soon acquired the art of balancing, and got so that he could walk about the house without the aid of canes or crutches, but when in the street he found it necessary to use a pair of canes. He has operated on the same pair of legs that were made for him in 1879 up to the present time. He is engaged in active business pursuits, and has reared and supported a large family.

Since 1879 the firm of A. A. Marks has applied over fifty pairs of artificial legs to double thigh amputations; with knee locks, hip joints

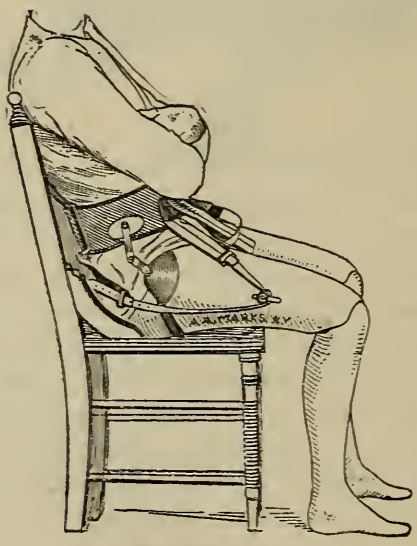


No. 688.



No. 689.

No. 690.



No. 691.

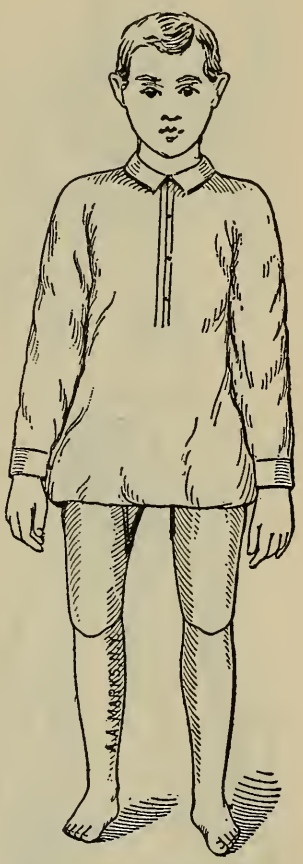
supporting bands, girts, and suspenders; the subjects have been enabled to manipulate their artificial legs successfully.

Cut No. 686 represents a case of double thigh amputations, front view. Cut No. 687 represents side view of the same case. It will be seen that both stumps are very short. Under earlier systems this case would have been considered hopeless, and the thought of artificial limbs would never have been entertained.

Cut No. 688 represents the same case with a pair of artificial legs applied, front view. Cut No. 689, rear view.

Cut No. 690, side view; and Cut No. 691 represents the same case seated. These cuts show the knee locks, hip joints, suspenders, waist

No. 692.



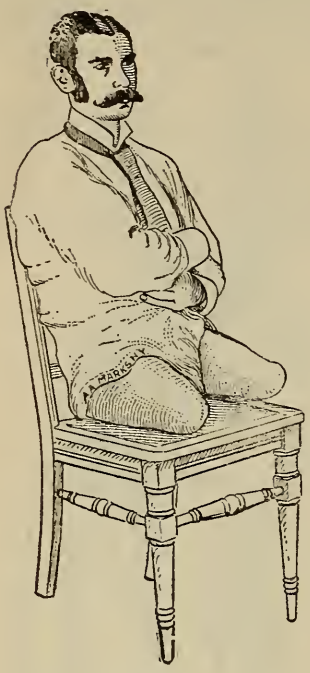
No. 693.

band, and roller straps. To these auxiliary attachments and to rubber feet can be ascribed the successful results that attended the case. On account of the limited lengths of stumps it was deemed advisable to make the artificial legs as short as possible, without producing noticeable disproportions.

Cut No. 692 represents a subject with both legs amputated midway between the body and knees.

Cut No. 693 represents the case with artificial legs applied. This subject was a boy of nine years; he lost both of his legs by trolley cars. After a very brief time the child was walking about the house without the aid of canes or crutches. Although his gait was slightly awkward,

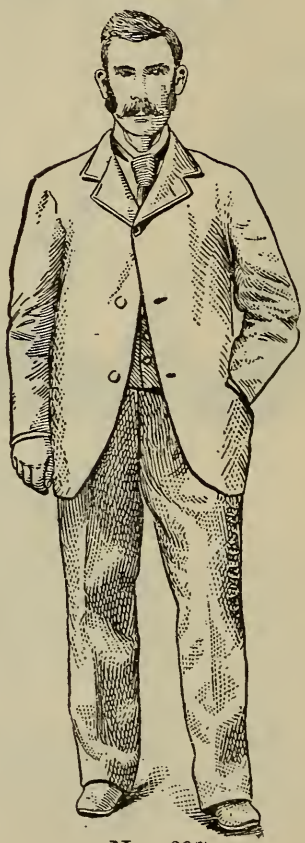
his ability to get about without the assistance of an attendant was a source of great relief to his parents and comfort to himself.



No. 694.

No. 695.

No. 696.



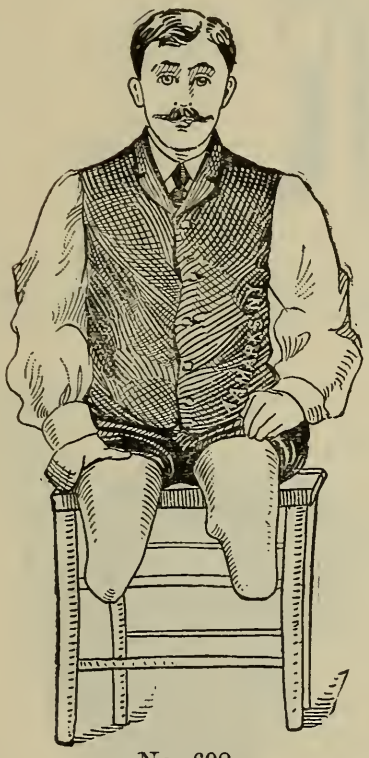
No. 697.

Cut No. 694 represents double thigh amputation, the results of a railroad accident. Cut No. 695 represents suitable artificial legs

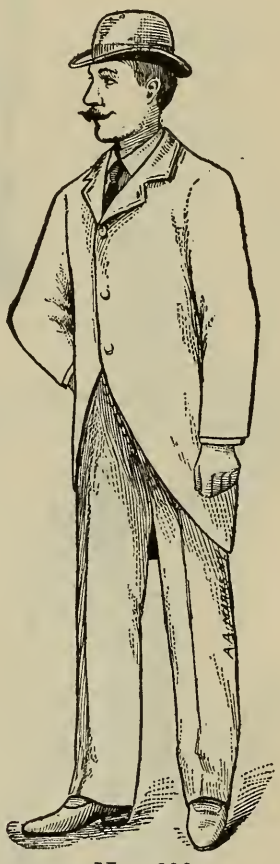
applied, with knee locks, hip joints, and other helping attachments. The results attending this case are the most remarkable on record. Within two months after the artificial legs were applied this gentleman was able to walk without the aid of canes or crutches. He bent his knees in a natural manner, could turn around when walking or standing, and sit down and rise from his chair without aid.

Cuts Nos. 696 and 697 represent the same case standing, one with legs exposed and the other with legs dressed.

Cut No. 698 represents double thigh stumps; amputations were



No. 698.



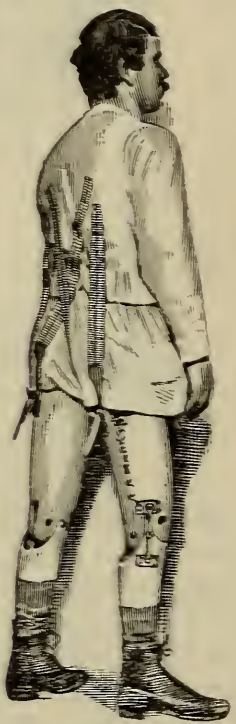
No. 699.

made to remove deformed parts. Cut No. 699 represents the same case with artificial legs applied. On account of the great lengths of stumps, it was not deemed necessary to apply hip joints or waist bands. This subject is a musician and in a brief time after his artificial legs were applied he was able to walk naturally and perform all the operations necessary to conceal his loss and appear gracefully in public. The artificial legs were constructed on the plan of No. 587, and the methods of suspension were ordinary. This man has a national reputation as a clarionetist. He walks on the stage, plays the instrument, acknowledges encores, and retires in the usual stage manner.

Cut No. 700 represents double knee disarticulations. A pair of No. 549 legs were applied with suspending straps, attached to a vest which the subject wore under a white shirt.

No. 700.

Cut No. 701 represents the artificial legs applied, and Cut No. 702 represents the subject dressed and walking. This man goes about with-



No. 701.

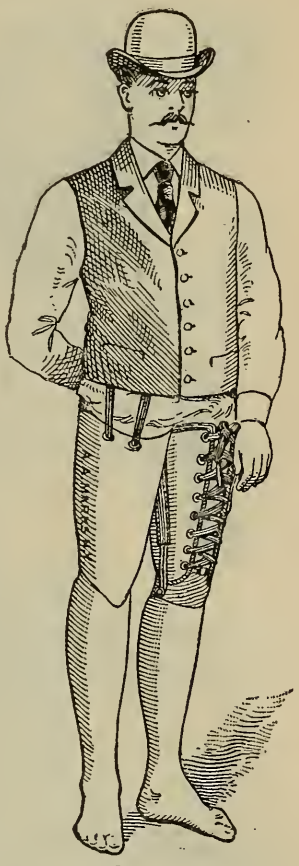
No. 702.

out the aid of canes or crutches; in walking he does not disclose his maimed condition to any perceptible degree. He attends to his business and earns a comfortable livelihood. The legs have automatic

knee locks which admit of limited motion for graceful movements, the motion being arrested at a point that enables him to recover his equilibrium when necessary. For sitting convenience he can throw the knee locks out of action, thus admitting the legs to flex to the full limit.

We have applied a great many pairs of artificial legs to double thigh amputations. We were the first manufacturers to have undertaken the task and to have met with successful results. We ascribe the success attending these cases largely to rubber feet,

No. 703.

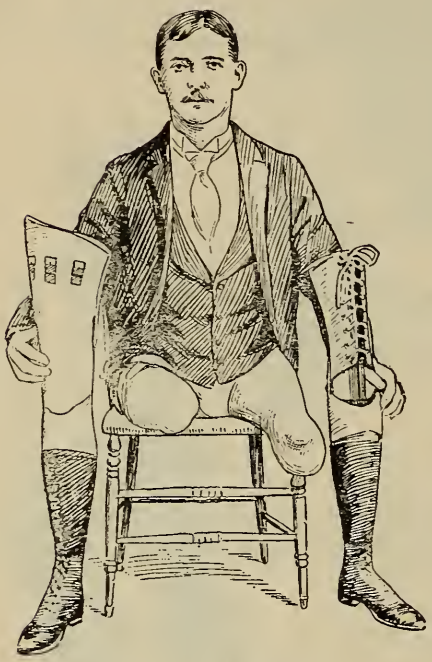


No. 704.

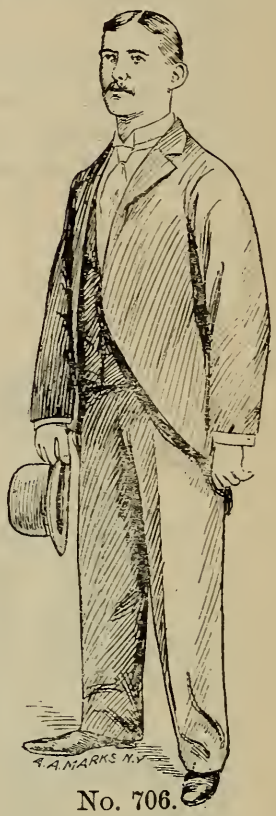
which, being attached permanently at the ankles, depending entirely on the elasticity of the rubber for accommodation (without springs, cords, or other mechanism), obtain a greater degree of safety and support than it is possible by mechanical feet, which compel the balancing or walking on limited bases without phalangeal support. Rubber feet permanently attached have removed forever the despair with which these cases have been regarded.

Cut No. 703 represents a double amputation, the right leg above knee and the left below knee. Cut No. 704 represents the same case with suitable artificial legs applied. Style No. 525 leg was applied to the right stump and style No. 589 to the left. These legs were supported by means of straps connected with waist band and shoulder suspenders.

Cut No. 705 represents a double amputation. Right stump five and one-half inches from the body, and left stump two and one-half inches below the knee. No. 525 leg was applied to the right side, and No. 589

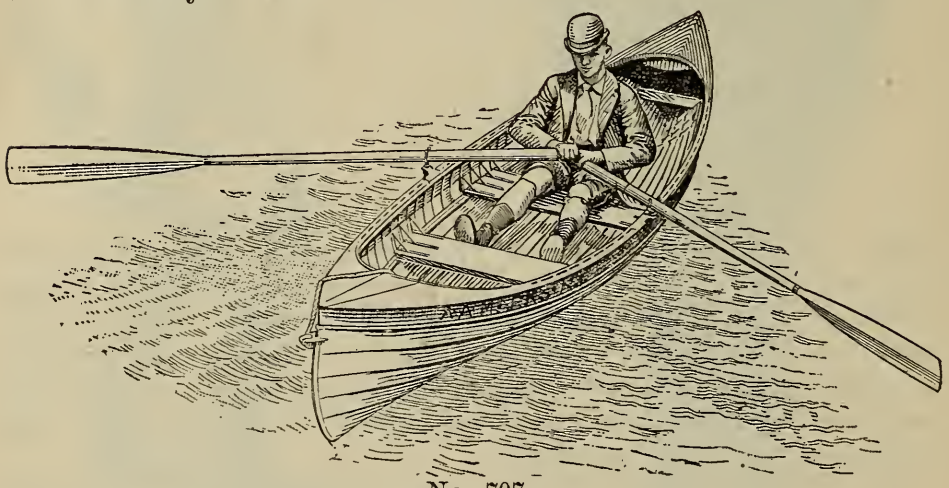


No. 705.



No. 706.

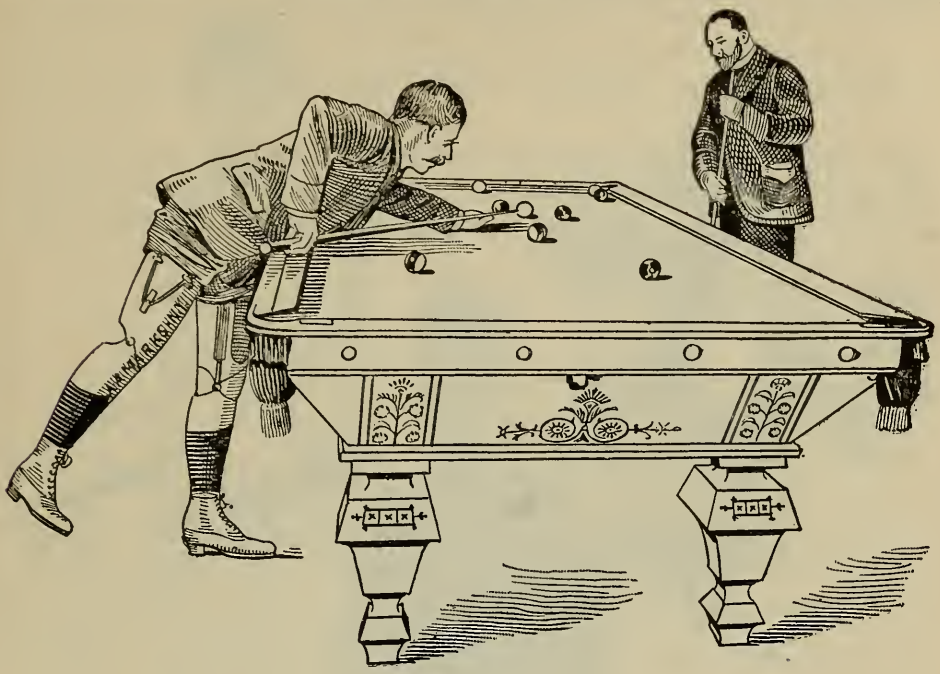
to the left. The subject was restored to not only a natural appearance, but the ability to walk without the aid of canes or crutches, and so



No. 707.

naturally that he has associated with persons for long periods without betraying the fact that his lower limbs were artificial. This young man has walked half a mile in eight minutes without great effort. He works at the bench during the day, and in the evening frequently spends hours at the billiard table.

Cut No. 706 represents him as he appears on his artificial legs, and in street attire. This man frequently rides horseback, rows a boat,



No. 708.

climbs a ladder, and indulges in those hazardous undertakings that require sound footing.

No. 709.

Cut No. 707 represents Mr. Kehr in a rowboat, showing the manner in which he can brace himself while pulling a strong oar.

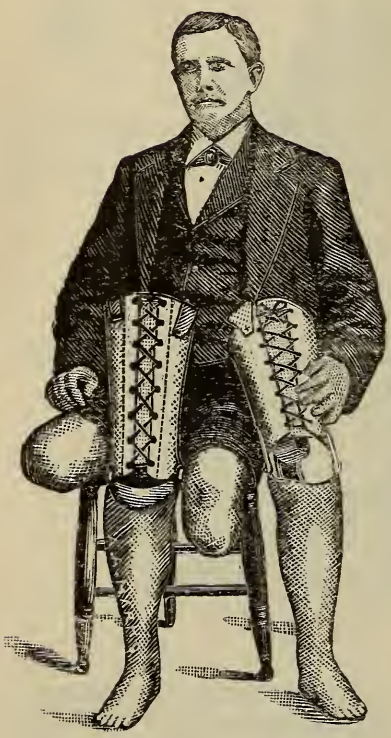
Cut No. 708 shows him at the pool table, and the manner in which he can balance himself on one foot while making a difficult shot.

Cut No. 709 represents him on a ladder, a great distance from the

ground; his footing is sound, his arms are free; he can hold a paint can in one hand while he applies a brush with the other.

No. 710.

No. 711.



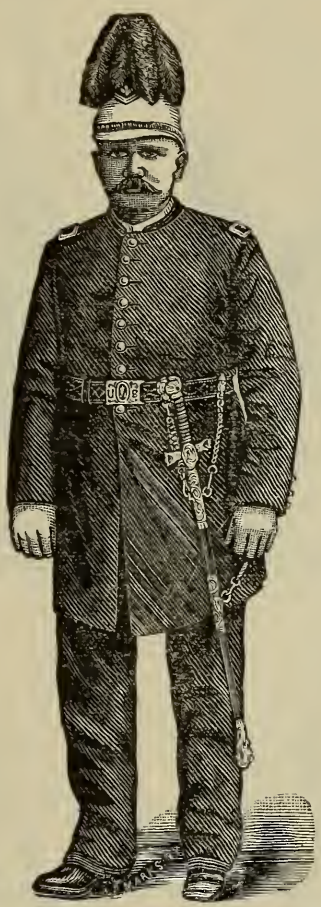
No. 712.

No. 713.

Cut No. 710 represents him riding horseback, securely seated in the saddle and feet in stirrups.

Cut No. 711 represents an amputation of both legs, the right nine inches from the body, and the left four inches below the knee. A No. 525 leg was applied to the right side, and a No. 589 to the left. The results attending this case were as brilliant as those previously referred to.

Cut No. 712 represents a case with both legs amputated. The right disjointed at the knee, and the left amputated three inches below the knee. Style No. 587 leg was applied to the right stump, and style No.



No. 714.

589 to the left. This man when in street attire presents the appearance of a person in possession of his natural extremities, as shown in cut No. 713. He walks naturally; never consents to use a cane. He is a member of the Knights of Pythias, and takes great pride in parading with his lodge. He walks great distances without experiencing unusual fatigue. Cut No. 714 represents him in his Pythian uniform.

Double amputations, with the sacrifice of one or both knee joints, have been regarded as difficult for prothetical treatment, and only within the few past years have they been taken out of the category of doubtful cases. Those that are considered below offer no difficulties to the skilled prothetician.

Cut No. 715 represents a double amputation ; the right three inches

below the knee, and the left two inches below the knee; end of the tibia in the right stump protrudes, and is only covered by cicatricial

No. 715.

No. 716.

tissue. The extremity of the fibula in the left stump is prominent and extremely sensitive. Notwithstanding these conditions, a pair of No.

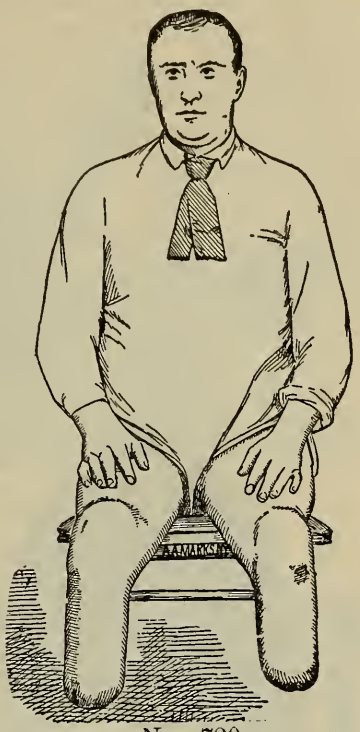
No. 717.

No. 718.

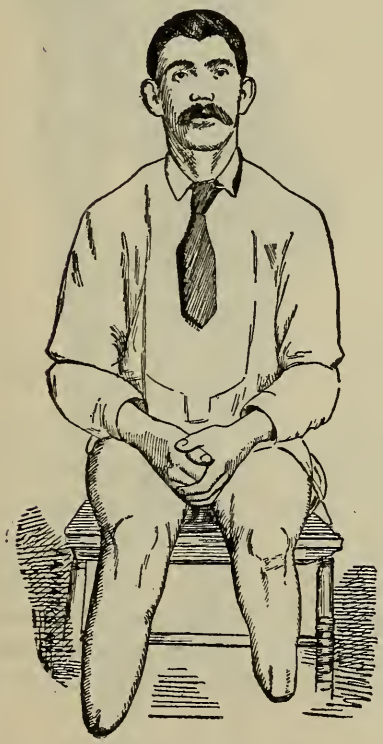
589 legs was applied and worn with comfort and efficiency, the subject working on a farm and earning a comfortable livelihood.

Cut No. 716 represents a double amputation, each stump extending to a point a short distance below the knee.

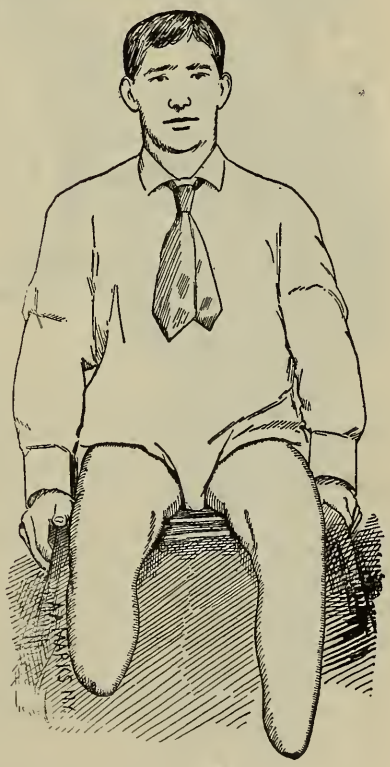
No. 719.



No. 720.



No. 721.



No. 722.

Cut No. 717 represents a similar case with longer stumps.

Cut No. 718 represents a similar case, with deep folds of tissue at the extremities, and cicatrized spots on the front faces of the stumps.

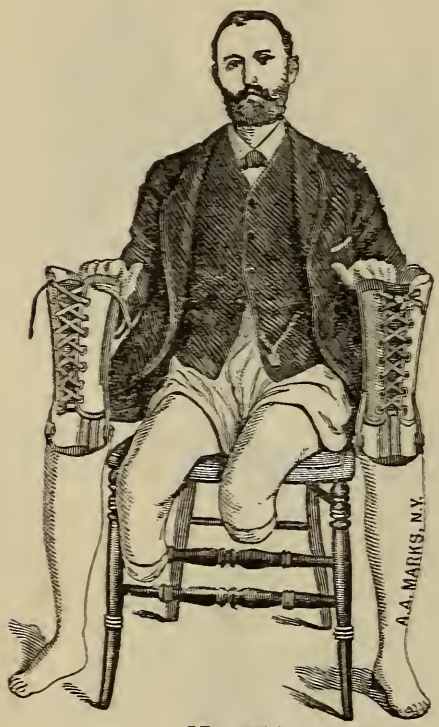
Cut No. 719 represents a double amputation. Left stump a trifle longer than the right; extremities tender, forbidding pressure.

Cut No. 720 represents a double amputation, the right stump a trifle longer than the left; extremities tender, forbidding pressure.

Cuts Nos. 721 and 722 represent double amputations.

All the above cases were supplied with artificial legs constructed on the plan of No. 589. The wearers have all become expert in the use of their artificial limbs, capable of earning their own livelihood and supporting their families.

Cut No. 723 represents a double leg amputation. The right stump



No. 723.

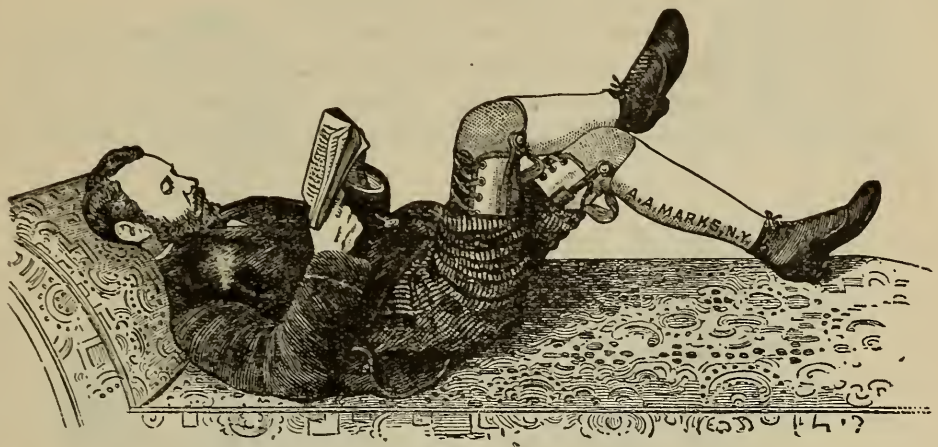
No. 724.

six inches in length, and the left three inches in length. Suitable artificial legs are shown in the same cut.

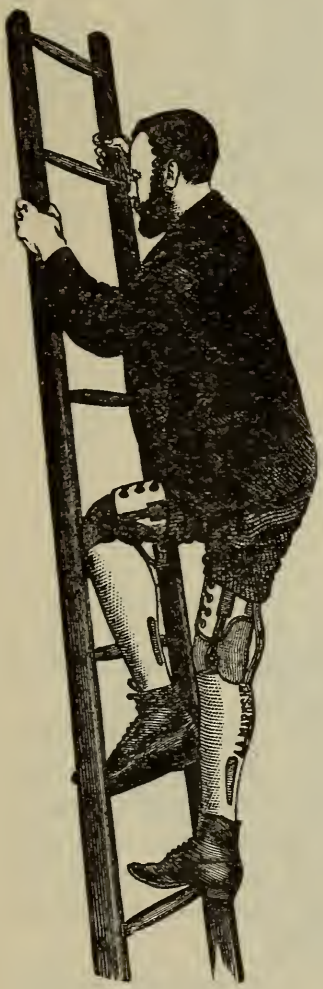
Cut No. 724 represents artificial legs applied and exposed. This is the case of Mr. Frank Stewart, who had both of his legs crushed by railroad cars when a lad. He has worn artificial legs with rubber feet for many years, and has been an active man all his life; it is not unusual for Mr. Stewart to take long walks in company with his friends, who are possessed of nature's limbs, and who become fatigued as soon as he. When Mr. Stewart is at home he occasionally throws himself on the couch in an easy manner as shown in Cut No. 725.

Cut No. 726 shows him in the act of ascending a ladder. His occupation requires him to ascend ladders and take weighty articles from the shelf. He can balance himself on the rungs, while his

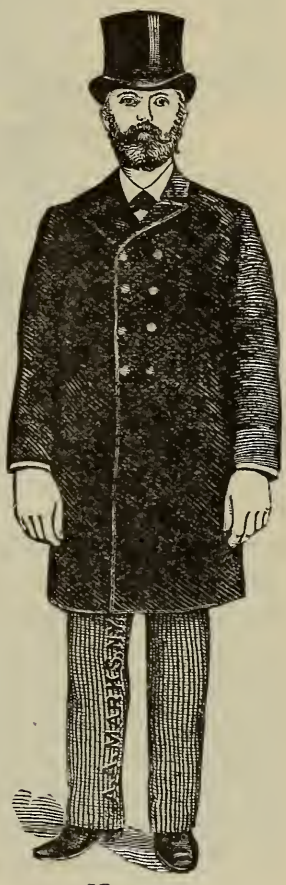
hands are employed in lifting or carrying the articles he has to handle.



No. 725.



No. 726.



No. 727.

Cut No. 727 represents Mr. Stewart in his street attire. Every evidence that his nether extremities are artificial is concealed. He is a

man among men, engaged in an active business pursuit, and for recreation joins his fellow-associates in an occasional outing, where fishing, hunting, boating, and other sports are indulged in.

Although it may appear to be extraordinary for a man wearing two artificial legs to engage in labor of the most arduous kind, or indulge in sports of the most active character, it is an actual fact that men with artificial legs, who have healthy bodies, are just as prone to indulge in

No. 728.

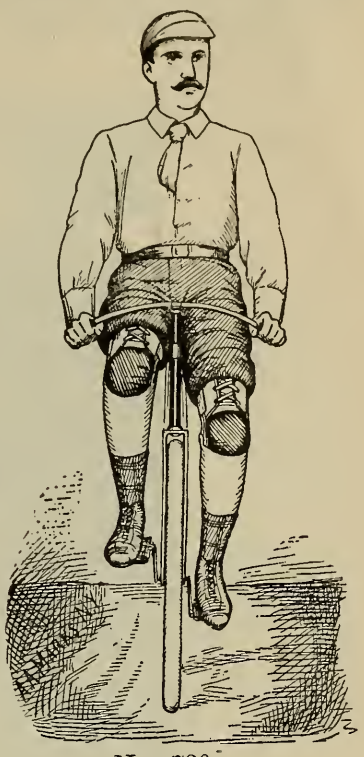
invigorating sports as others. Sometimes they go beyond the limit of needful exercise, and vie with professional athletes.

Thomas Cleary, who is represented in Cut No. 728, is one of this kind. He has made a number of public exhibitions of his marvelous pedestrian achievements. He has walked against time and competitors, and, although he wears two artificial legs, there are few with natural legs who care to keep pace with him. He stands to-day without a challenger. The cut represents him as he appeared before an enthusiastic crowd a few years ago.

Cut No. 729 represents Mr. James McDonald, who had both his legs crushed by a railroad train, and amputated below the knees. With a pair of No. 589 legs applied, he is equal to any task; he walks naturally, he rides a bicycle, as shown in Cut No. 730, in winter he often indulges in skating, as shown in Cut No. 731; he frequently attends

parties, and always engages in the dance. He has been seen to leap over a fence four feet high, and never hesitates in joining his com-

No. 729.



No. 730.

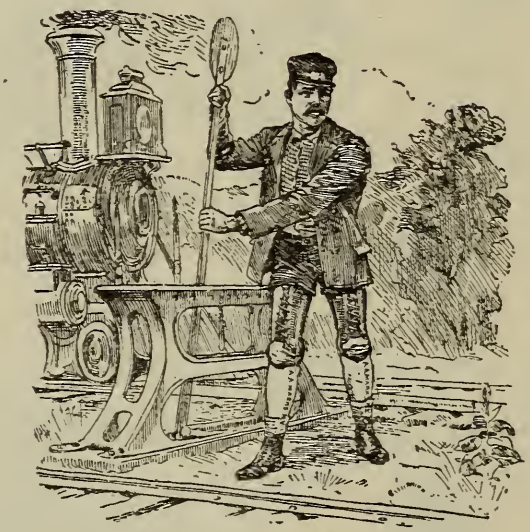
No. 731.

panions in everything they do that demands safe and sound footing and agile movements.

Cut No. 732 represents Mr. William J. Harms, who had both of his legs crushed and amputated. With artificial legs applied, he fills the position of baggage master and station agent at Parksville,

No. 732.

N. Y. His position requires him to shoulder heavy trunks, put them on trains, and handle baggage of all descriptions. He acknowledges

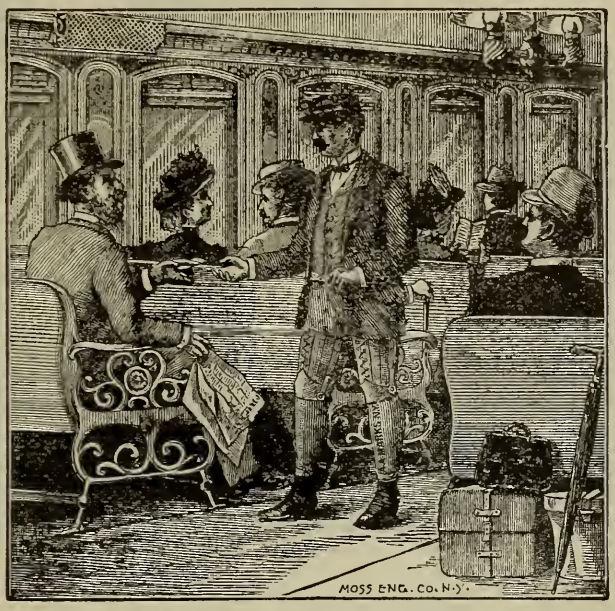


No. 733.

that he has frequently carried on his shoulder trunks that weigh over one hundred and twenty-five pounds.

Cut No. 733 represents a switchman on one of the Western railroads who wears a pair of No. 589 artificial legs. He attends to the duties of his position with the same ability as one having natural limbs. He has to move quickly, step over ties and rails, hasten from one track to another, and brace himself when moving a hard switch. His artificial legs serve him in these duties in the most reliable manner.

Cut No. 734 represents a young man wearing two artificial legs for

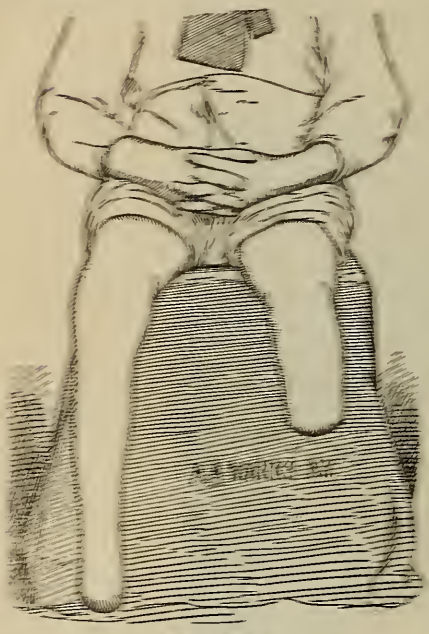


No. 734.

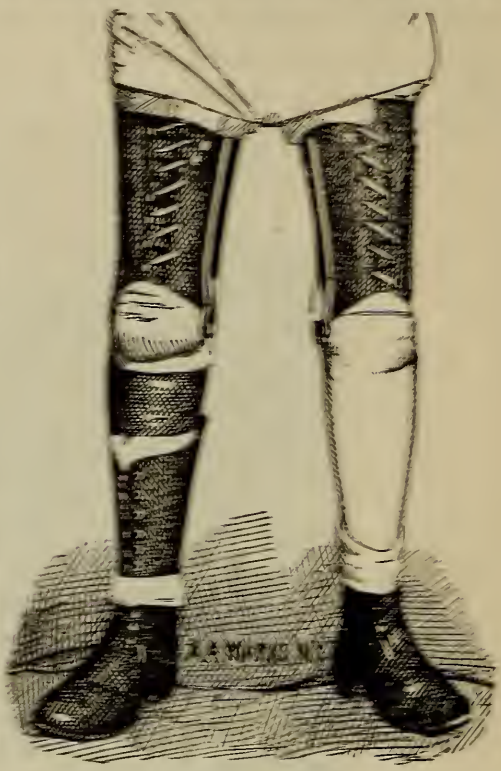
amputations below the knees. He is a conductor on a Western express train, and is rendered capable of performing the services required of a conductor in the most efficient manner. He walks through the train when going at its greatest speed. He collects tickets and punches them with the suavity of one proud of his position; the car jolts, pitches, sways, and he retains his balance with no more effort or awkwardness than if he were in possession of his natural legs.

At stations he alights with agility, watches passengers, gives signals, and boards his train. It seldom occurs to him that his lower extremities are not real, and he never betrays that fact to others. Day after day, for many years, he has performed this round of duties, and not a soul has had occasion to suspect his actual make-up, and only those to whom he voluntarily reveals his condition ever know of his dependence an artificial extremities. His movements are graceful, his appearance is natural, his step is firm and elastic, and his power is complete. With wooden articulating feet it would not be possible for his to discharge such duties. He would feel unsafe, tottlish, and unsteady, but with rubber feet, rigidly attached, he possesses sound footing and is capable of the most difficult feats of balancing.

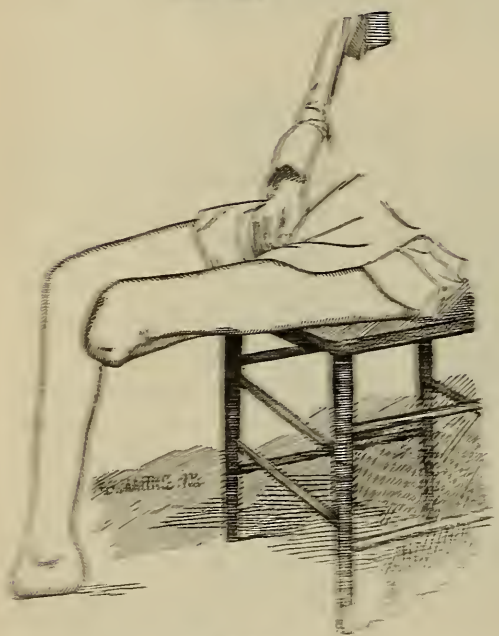
Cut No. 735 represents a double amputation, the right leg amputated at the ankle-joint and the left a few inches below the knee. The right



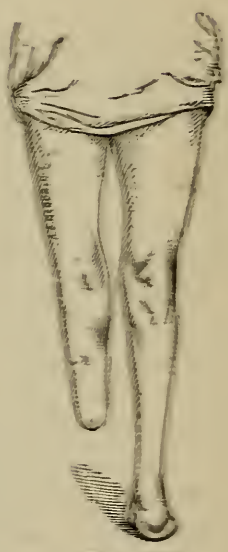
No. 735.



No. 736.



No. 737.



No. 738.

leg was incapable of bearing pressure upon the extremity, and, therefore, it was deemed advisable to apply an artificial leg constructed upon the plan of No. 693 to that side. The weight was carried about

the thigh and immediately below the knee, and none whatever upon the extremity of the stump or upon the sides of the leg. A No. 589 leg was applied to the left side. Cut No. 736 represents the same case with appropriate legs applied. The results attending this case justified the adoption of the legs selected. The man has for

No. 739.

a number of years engaged in an occupation that required him to stand and walk a greater part of the time.

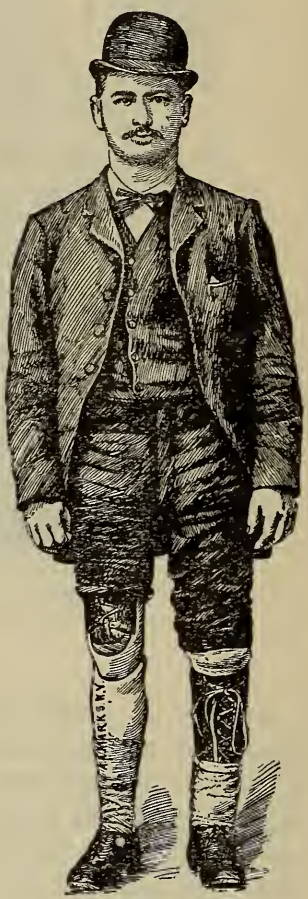
Cut No. 737 represents a double amputation, the right leg amputated in the body of the foot, after Chopart's operation, and the left an inch and a half below the knee. The application of style No. 661 leg to the right side, and No. 589 leg to the left side, removed this man's disability in a very complete manner. Cut No. 738 represents a double amputation—right leg below the knee and left at the instep, after Hancock's operation. A No. 589 leg was applied to the right side and No. 661 to left.

Cut No. 739 represents a double amputation—the right leg amputated below the knee and the left at the instep. No. 589 leg was applied to the right side and a No. 661 to the left. This man was restored to his ability to engage in his former occupation of oysterman. The cut represents Mr. Mills in a boat, raking for oysters on Long Island Sound. He says that he has devoted fifteen years to the oyster business, doing the work himself. During that time he has raked as many oysters, worked as many hours, and has actually done as much work as most of his fellow-oystermen who were in possession of their natural limbs.

Cut No. 740 represents a double amputation—right leg amputated through the knee-joint and the left at the ankle. In this case pressure could be carried on the extremities of both stumps. No. 559 leg was applied to the right side and a No. 638 leg to the left side.

Cut No. 741 represents Mr. Sterner with artificial legs applied, and Cut No. 742 represents him attired as he appears in daily life. He walks naturally, and attends to a laborious occupation without difficulty or hindrance.

No. 740.



No. 741.

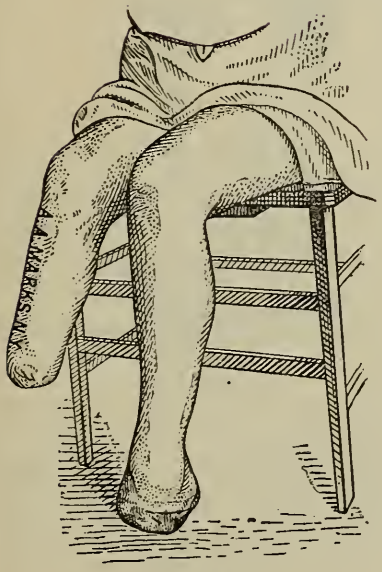
Cut No. 743 represents a right leg amputated a little above the ankle, and the left leg at the instep. A No. 589 leg was applied to the right side and a No. 661 leg to the left side.

Cut No. 744 represents a double amputation—right and left feet removed at the insteps. A pair of No. 661 legs were applied to this case, and the wearer was so completely restored that he found himself able to walk great distances without fatigue.

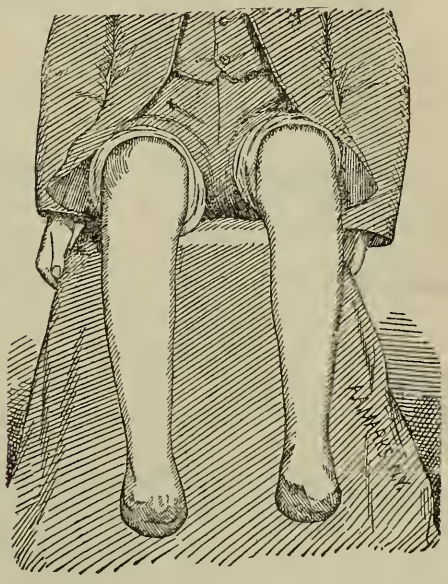
We feel that the cases above quoted are ample to establish the fact that no matter how greatly a man may become dismembered in his lower extremities, it is possible for him to become possessed of substitutes that are comfortable to wear, natural in their action, and advantageous. We have endeavored to show stumps of every character, length, and peculiarity, and combinations that will apply to every pos-

sible case. These are no empty boastings, exaggerations, or misrepresentations. Every one can be verified, and any incredulous person

No. 742.



No. 743.



No. 744.

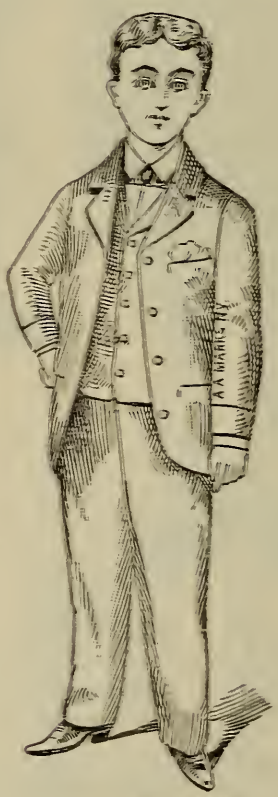
can have his doubts removed by writing or calling on any of the parties referred to; their names and addresses will be given upon request.

APPLIANCES, BRACES, AND EXTENSIONS FOR SHORTENED LIMBS.—APPARATUS FOR RESECTIONS, DEFORMITIES, AND DEFICIENCIES.

Many lower limb disabilities should be treated the same as amputations, as they demand either artificial legs, or parts of artificial legs, to make up deficiencies or to support the weakened parts.

It can safely be assumed that no matter what deficiency there may be in one or both of the lower extremities, that deficiency can be corrected to a helpful degree. No matter what weakness there may be in one or both legs, those weakened parts can be supported by mechanical devices. No matter how crooked, distorted, or deformed one or both legs may be, there is still hope of some appliance being attached that will improve locomotion, and that will hide the deformed parts from view. We will consider a few of the cases that have come under our treatment.

No. 745.



No. 746.

Cut No. 745 represents a case of arrested development. The child was healthily and normally constituted from the hips up, but from the hips down both legs were diminutive, ill-formed, and distorted. The child was capable of bearing his weight on the bottoms of his rudimentary feet, and by a wobbling motion and by the aid of crutches, he was able to get about in a very unnatural, fatiguing, and piti-

ful manner. The case was brought to us. Upon examination we found that we could force the legs into nearly correct lines without producing pain. A pair of artificial legs were applied that held the crooked limbs in their proper lines and elevated the child to his proper height. Rubber feet were attached to the extremities of the limbs. Weight was applied to the bottoms of the ill-formed feet, and in a very brief time the child was able to walk without crutches. He controlled the artificial knee joints by means of his feet, and found little or no difficulty in balancing, walking, sitting, rising, ascending

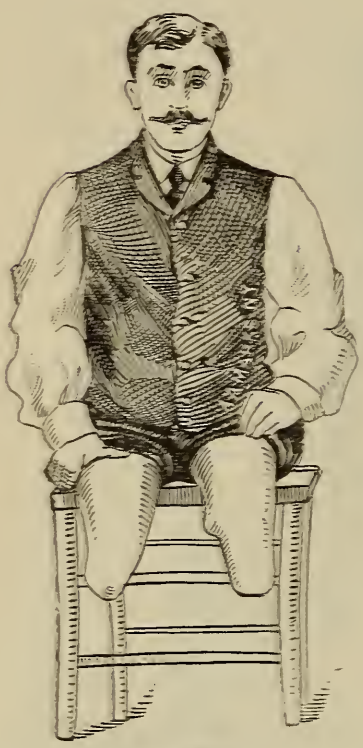
No. 747.

or descending steps. The articulations at the knees were on lines of progress, and the artificial legs corrected in a measure the rotated and abducted hip-joints and adducted knee-joints. Considerable attention was given to ornamentation, and the child, when dressed, had his deformities entirely concealed. Cut No. 746 represents the lad with legs applied and dressed.

Cut No. 747 represents a congenital deformity. The man was well formed from the hips up; on the inner sides of both thighs were bony protuberances; the legs seemed to have grown from the sides of the thighs, and the feet were inverted and ill-shaped. This person, during his adolescence, found locomotion only possible by hitching himself about on his haunches, or on his knees, dragging the deformed legs after him. The rolling chair was his only alternative. For twenty-five years he submitted to his unfortunate condition, paying no attention to suggestions that were made for his relief. When twenty-five years of age, his pride moved him to have something done that might

ameliorate his condition. Dr. Montague Boyd of Charleston, S. C., was consulted, and, after conferring with us, the removal of the bony protuberances from the right thigh and both legs at their junctures with the thighs was decided upon. The operation was skillfully and successfully performed, and the man was provided with two excellent thigh stumps, as represented in Cut No. 748. We applied a pair of artificial legs to him, as represented in Cut No. 749. This case is referred to more at length on page 121.

Cut No. 750 represents the lower extremities of a case of obstructed



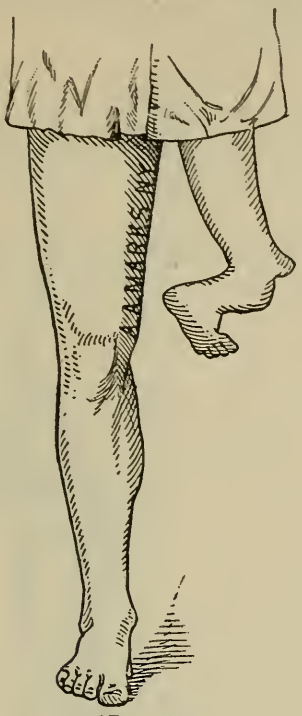
No. 748.

No. 749.

growth; the left leg rudimentary and greatly deformed, the hip joint normal, the thigh possessing nearly the proper length terminating in a very short and deformed leg. A number of places on the extremity of the thigh and the tibial aspect of the leg afforded surfaces for pressure.

Cut No. 751 represents a leg devised for the case. When applied and both limbs dressed, the deformity was concealed, and both legs presented similar appearances. This man was able to walk nearly as well as if his left extremity were natural. A slight enlargement of the trousers a little above the knee (necessary to accommodate the deformed leg) was the only noticeable difference in the two sides, and that difference was so slight that attention was seldom

tracted to it. The main object in this case was achieved—that of abling the man to walk without canes or crutches.



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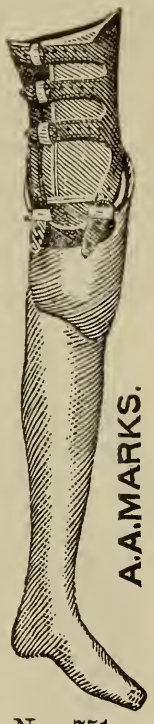
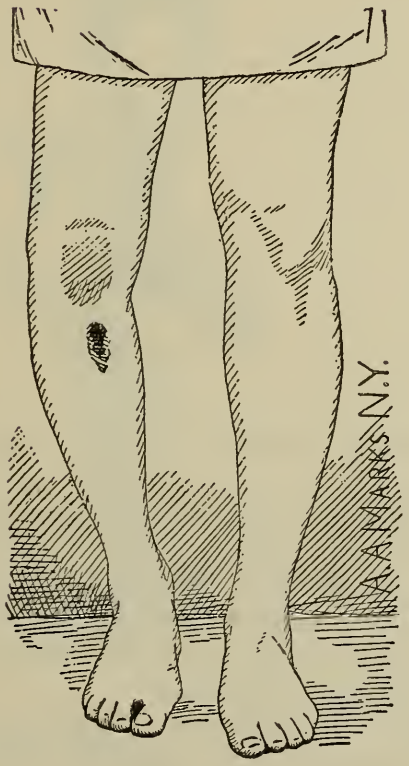


No. 751.



No. 752.

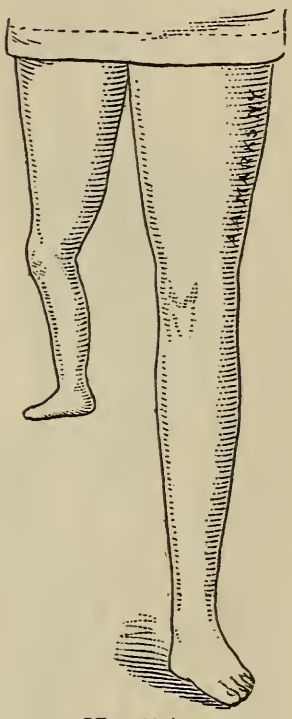
No. 753.

Cut No. 752 represents an ununited fracture of the right tibia, due to gunshot wound received in the Civil War. The injury was

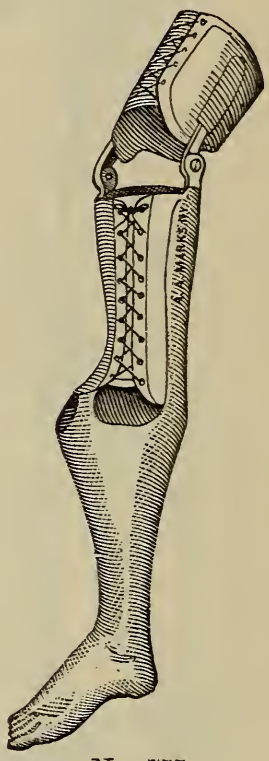
confined to the tibia. On account of tibial weakness the fibula was overtaxed, and a support became necessary. An indentation deep enough to hide a finger had always been present in the leg at the point of injury, two inches below the knee.

Cut No. 753 represents the brace that was applied. It relieved the fibula, by carrying the weight of the wearer about its top. The injury caused a shortening of an inch and one-half in the entire length of the leg; a half sole was attached to the extremity of the brace to compensate for the shortening.

Cut No. 754 represents a deformity of the right leg; the hip, thigh, and knee normal and healthy, but the leg and foot arrested in their



No. 754.



No. 755.

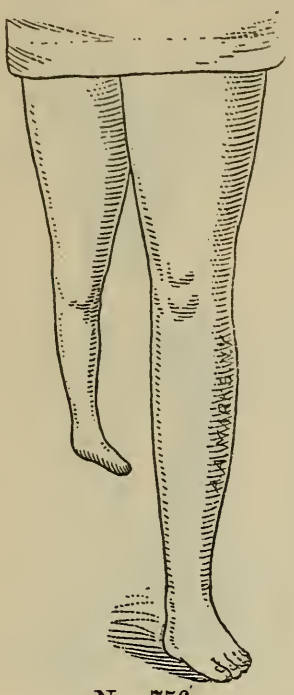
growth remained diminutive, capable, however, of taking weight at the bottom of the foot.

Cut No. 755 represents an artificial limb especially devised for the case. The undeveloped leg was received into the socket, the foot protruded through an aperture on the external side, knee joints and thigh piece were placed above the knee, receiving support and strength about the thigh. A rubber foot at the lower extremity completed the structure and provided a support adapted to the case.

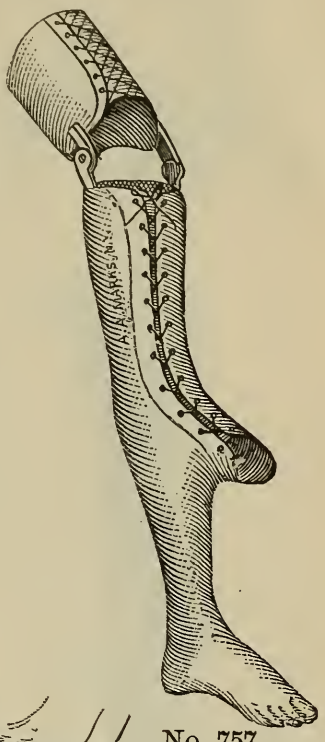
Cut No. 756 represents a deformity of the right leg; hip joint normal, thigh abnormally short, knee joint weak, leg and foot short and atrophied.

Cut No. 757 represents an artificial leg designed for the same. The leg supported the weakened member and added sufficiently to com-

pensate for deficiency in length. The socket encased the leg and foot, the joints strengthened the knee, and the thigh part encased the thigh. The deformed foot was dropped to the limit of toleration, so as to be



No. 756.



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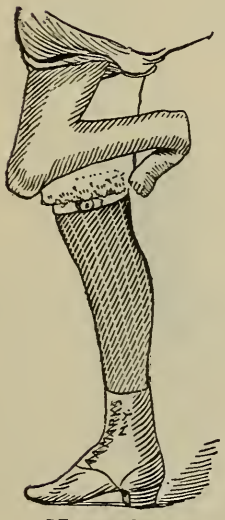
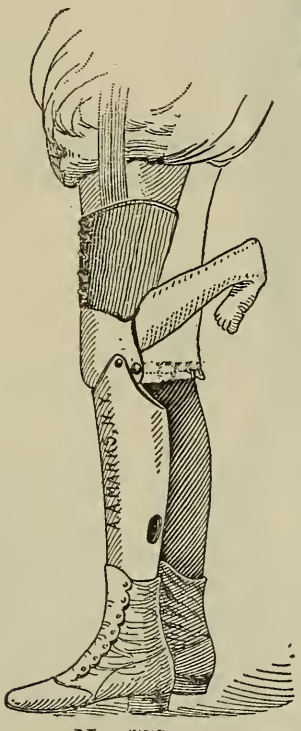


No. 758.



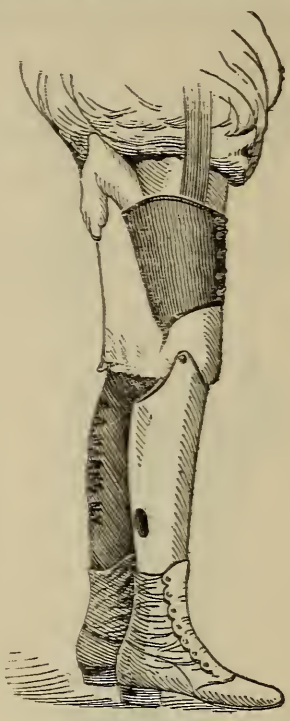
No. 759.

better concealed by the trousers. This appliance proved to be efficient and satisfactory.

Cut No. 758 represents a deformed left leg. From knee down the leg was misshapen, contracted, and distorted. Cut No. 759 represents a suitable artificial leg applied. The deformed parts well up and out of the way.

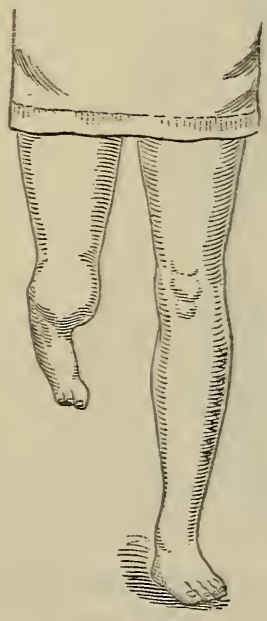
Cut No. 760 represents a deformed lower right leg, quite similar to the one previously described; the knee, however, admitted of more

No 760.



No. 761.

flexion, and the artificial leg was made to receive the thigh and deformed part in one socket, held in place by means of a leather sheath



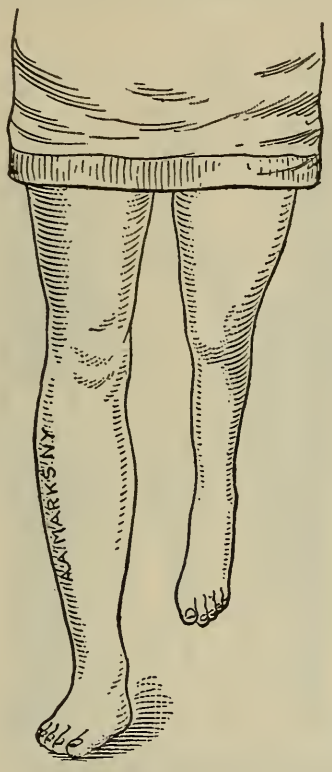
No. 762.

No. 763.

passing from the rear and lacing on the front line of thigh, as represented in Cut No. 761.

Cut No. 762 represents a deformity of the right leg. The hip and

thigh were normal, the bones of the leg rudimentary or absent. A foot rather undersized appeared to have grown from the knee downward. The patient was able to flex and extend the foot the same as a leg, or, in other words, he had an articulation at the junction of the thigh and the foot. Cut No. 763 represents an artificial leg devised for the case. The leg is similar, in its general construction, to that represented in Cut No. 589. The socket of the leg was excavated to receive the foot, the knee joints and thigh support encased the thigh and gave the foot control over the artificial part. The results proved



No. 764.

No. 765.

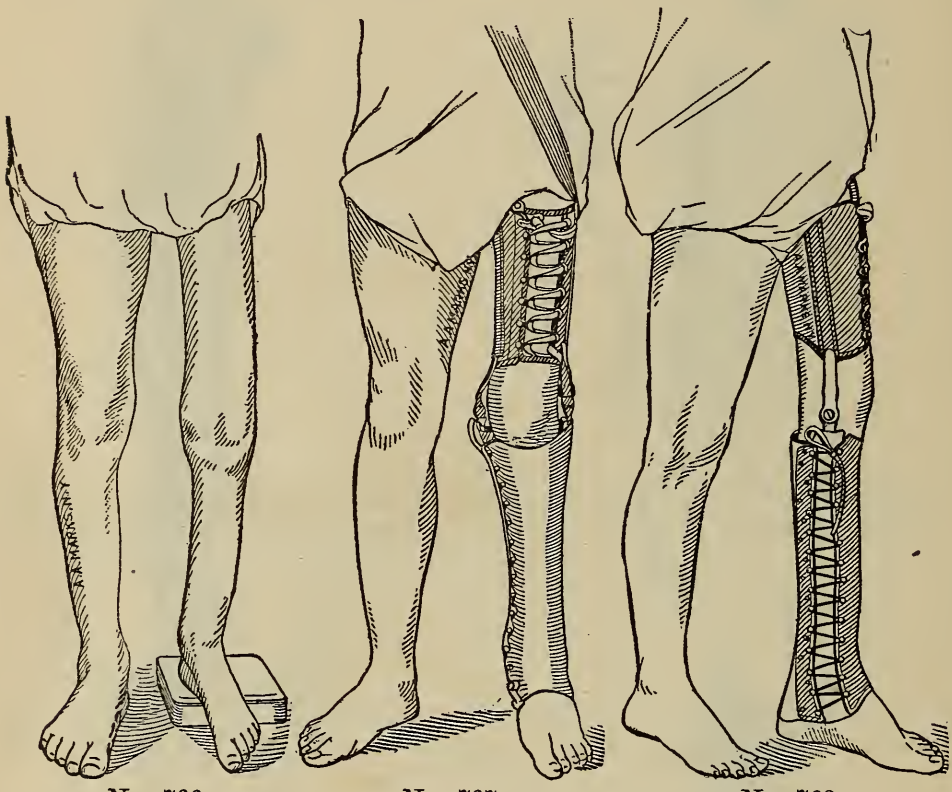
that the amputation of the foot at the junction with the knee would have been an unwarranted sacrifice.

There are three important features to be regarded in constructing and applying braces and extensions for shortened legs. First: Supplying the deficiencies in length; second, providing fittings that are comfortable, and third, concealment of the deformities. It is frequently difficult to harmonize the second and third conditions, and occasionally the cause for many experiments. The foot must be inclined in order to admit of being concealed by the trousers, and the degree at which the foot can be inclined governs the extent to which the concealment can be carried. It is not always possible for the subject to determine the "greatest angle of endurance" of the foot, and as this is an important matter, it should be considered necessary for the subject to confer with us personally, and permit us to determine that point. This is more important with a gentleman than with a lady, as the lady

can conceal the appliance by her skirts more readily than a man can by his trousers.

Cut No. 764 represents an undeveloped left leg, the entire limb considerably atrophied and the joints weak, caused by infantile paralysis.

Cut No. 765 represents an artificial leg expressly designed for the same. The deformed leg is received in the socket and laced in place, the foot dropped to the angle of toleration. The thigh piece encases the thigh and the knee-joints support the knee. A rubber foot is placed at the extremity of the artificial member which completes the structure



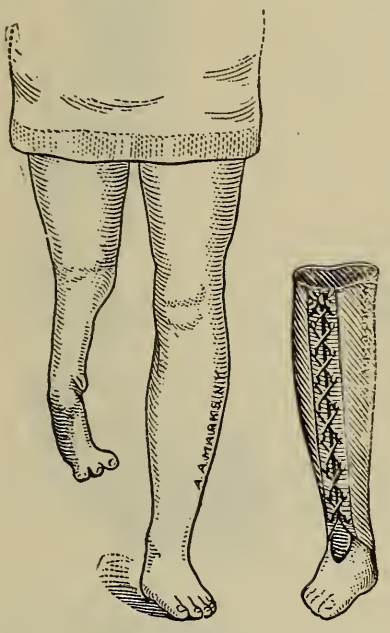
No. 766. No. 767. No. 768.

and provides a means that enables the wearer to walk without the aid of canes or crutches and without any perceptible limp.

Shortened and paralyzed legs are frequently accompanied with total loss of the power of extension and flexion in the knee joints. In such cases, the mechanism of the artificial knee joints are provided with locks that hold the knees rigid when standing or walking. The joints are capable of being unlocked to admit of flexion when sitting.

Cut No. 766 represents a shortened, weakened, and atrophied leg, the results of hip joint disease in youth. Cuts Nos. 767 and 768 represent the same case, with brace and extension applied. The structure consists of a socket that encases the leg, knee joints that support the knee, thigh piece that takes support about the thigh, and a rubber foot that is placed under the deformed natural foot in order to obtain the proper height.

Cut No. 769 represents a right leg deformed from the knee down. The deformity consisted of a malformed foot, a deficiency in length, and abnormal relations of the tibia and fibula. The tibia extending to the ankle, without connecting with the foot; the fibula connected with the foot, but not with the knee. The two bones appeared to be held by cartilage only. When the subject placed his weight on his right foot, he would sink over an inch; no pain followed, but the leg lacking structural support rendered the subject incapable of walking but short distances. Cut No. 770 represents the appliance devised for the needs of the case. It consisted of an aluminum shell, ham-



No. 769.

No. 770.

No. 771.

No. 772.

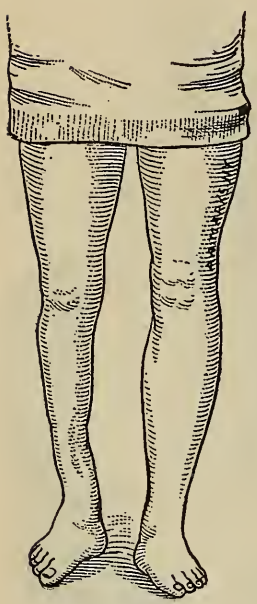
mered to proper shape, and made to comfortably encase the leg and foot from the knee down, extending upward to the slope of the knee, where weight was received. Every time the wearer applied his weight to the right side, he supported himself immediately below the knee. The aluminum shell held the fibula and tibia in juxtaposition. A rubber foot was placed under the shell so as to obtain proper length and obviate the jar when walking. The wearer has had the above appliance in use for many years, and has found it to be valuable beyond estimate. He can walk great distances without fatigue, and can attend to his vocation with nearly the same ability as if his right leg were normally constituted.

Cut No. 771 represents a shortened and imperfectly formed leg, which from the knee down was atrophied, and shortened by four inches when compared with the opposite leg; knee normal and weight capable of being carried on the bottom of the foot.

Cut No. 772 represents a suitable leg for the same. This leg was

constructed to receive the deficient member, and give proper support to it. A rubber foot, placed under the foot-rest, produced the required length. In this case, it was not possible to drop the toe to a concealable angle, therefore, the appliance presented the appearance of a double foot, but, as the natural foot was somewhat smaller than the artificial, it became possible to conceal the encased foot by trousers with broad bottoms.

Cut No. 773 represents an ununited fracture in the right leg imme-



No. 773.

No. 774.

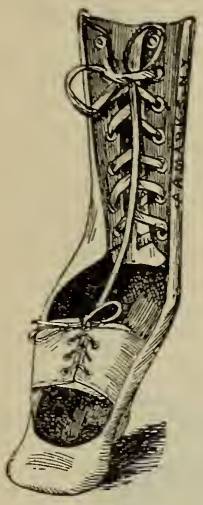
No. 775.

diately above the ankle. Usually, in cases of this kind, it is deemed advisable to remove the leg by amputation, but in this case the patient would not submit, and as several attempts to force union had failed, further attempts in that direction were abandoned, hoping that, as the subject was young, nature, through her mysterious ways, might unite the two parts ; therefore it was deemed advisable to apply a brace that would take the weight entirely away from the bottom of the foot and transfer it to the leg below the knee.

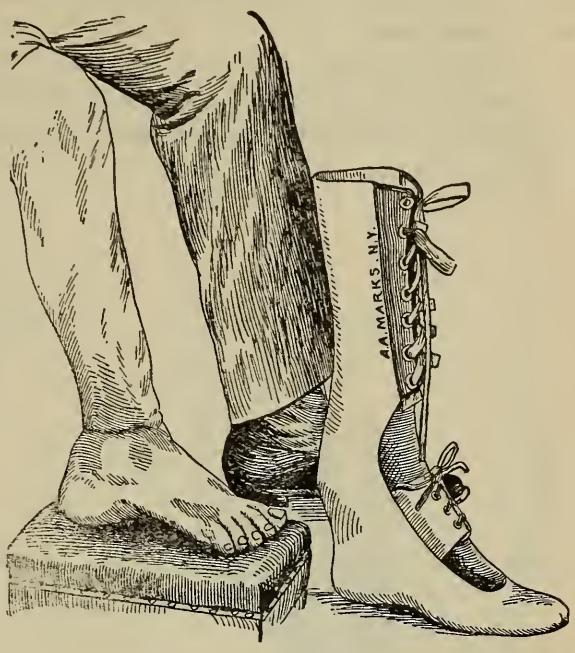
Cut No. 774 represents the appliance constructed for the case. It consisted of an aluminum shell which encased the leg in a manner that held the parts in proper positions, and at the same time carried the weight from the knee to the floor. The child has worn this shell for some time, and has been able to be about and take active and healthful exercise.

Cut No. 775 represents a deformed leg and foot. The foot on the right leg had the appearance of having grown from the external side of the

tibia, the fibula imbedded in the tarsus. Weight could be carried on the bottom of the foot, and on the extremity of the tibia.

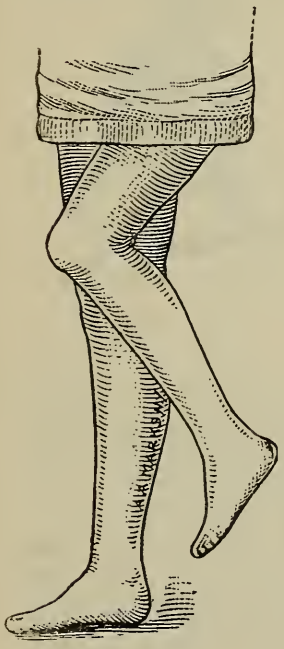


No. 776.

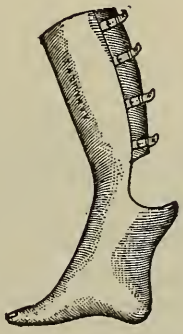


No. 777.

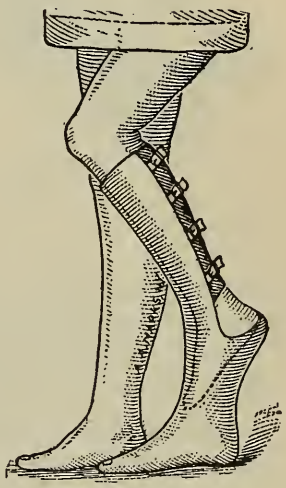
Cut No. 776 represents a leg designed for the case.
Cut No. 777 represents the side views of deformed and artificial legs.



No. 778.



No. 779.



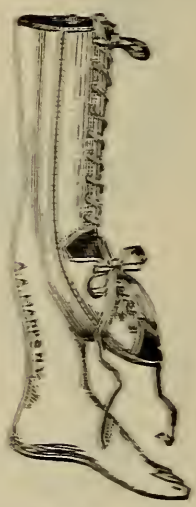
No. 780.

The socket of the artificial leg was fitted to all the sinuosities of the deformed leg and foot, and supported those parts so that weight would

have a general distribution over parts of vantage. The wearer was capable of walking with this appliance without the aid of a cane. He suffered no hindrance or discomfort, and had his deformity very effectually concealed.

Cut No. 778 represents a left leg, anchylosed at the knee. This condition was brought about by a gunshot wound received in the War of the Rebellion. The knee became bent to nearly right angles and stiff. The angle at which the leg became fixed caused a vertical shortening

No. 781.



No. 782.

of about four inches. Hip motion normal, thigh and leg well developed, foot healthy and capable of bearing pressure on its sole.

Cut No. 779 represents an extension designed for the same.

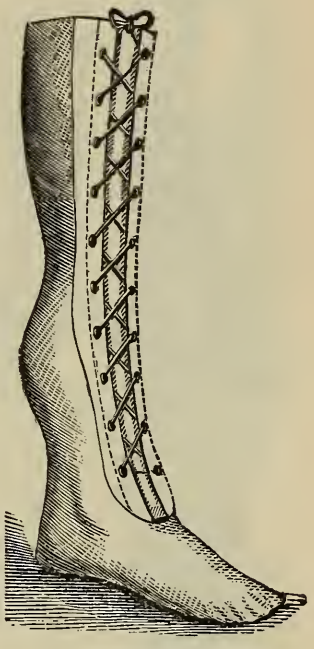
Cut No. 780 represents the extension applied. As will be seen, the leg was received from the rear, and held in place by lacing. The axis of the body was carried down the affected leg a little back of the center of the knee and through the arch of the foot. This direction of force was accommodating to the conditions, and enabled the wearer to walk with little exertion and with great comfort.

Cut No. 781 represents a shortened left leg caused by hip joint disease in youth. The shortening (located entirely at the hip) produced

a deficiency in length of about six inches; knee strong, bottom of foot capable of bearing weight.

Cut No. 782 represents a suitable leg designed for this case, the natural foot was dropped at a slight angle and made to rest on a shelf placed some distance above a rubber foot; the leg was encased by a socket made of wood and leather. As the shelf on which the natural foot rested was some distance from the floor, and as the subject was a female, the appliance was readily concealed by skirts; therefore, the

No. 783.



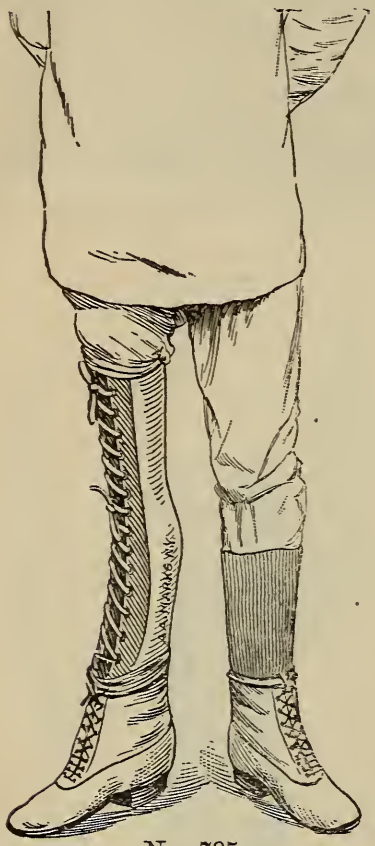
No. 784.

dropping of the foot to an extreme angle, merely for concealment, was not considered necessary.

In all cases of shortened legs, where the shortening is over three inches, we deem it necessary to have the extension brace run well up on the leg to very near the knee, in order to properly relieve the ankle of the strain that would otherwise come upon it. This strain increases as the distance between the ankle-joint and the floor becomes greater.

Cut No. 783 represents a shortened leg, right side, the deficiency amounting to about six inches. The angle at which the foot could be dropped, being considerable, the leg represented in figure 784 not only supplied the deficiency in length and supported the ankle and sides of the leg, but effectually concealed the disfigurement.

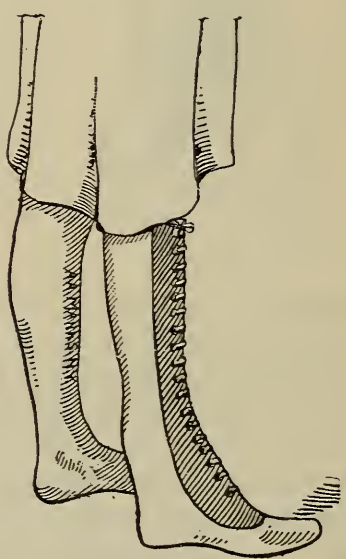
Cut No. 785 represents the support applied, and Cut No. 786 represents the manner in which the deficiency was concealed by the trousers.



No. 785.

No. 786.

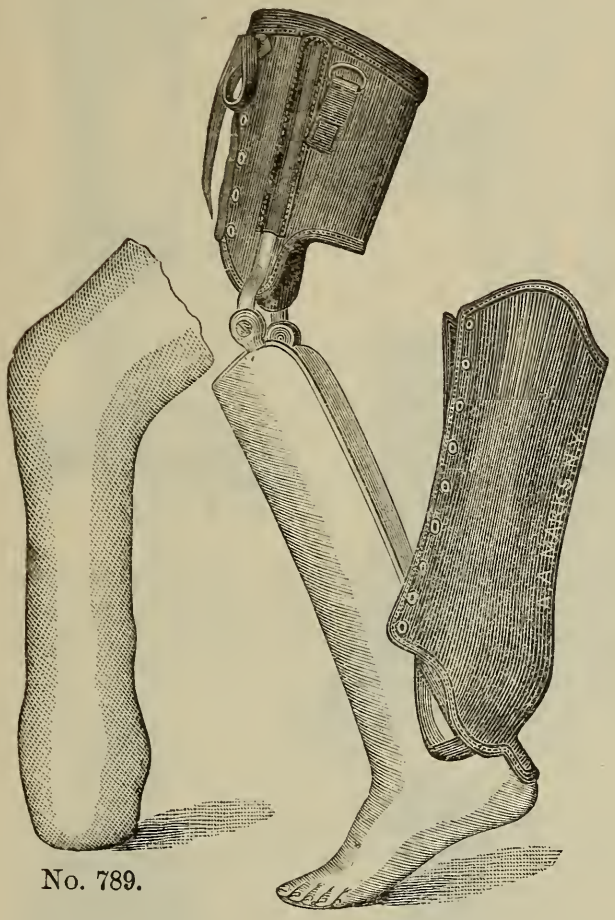
No. 787.



No. 788.

Cut No. 787 represents a leg shortened by hip disease, the shortening less than heretofore considered. Cut No. 788 represents a suitable support applied.

We have applied many hundred braces and supports to shortened legs in the manner above described, and have the conviction that it is the only way by which the requirements may be met in a complete and satisfactory manner. Sometimes persons afflicted in this manner wear shoes with thick cork soles and heels, or with iron frames attached to the bottoms of their shoes. Walking with such appliances is neither



No. 789.

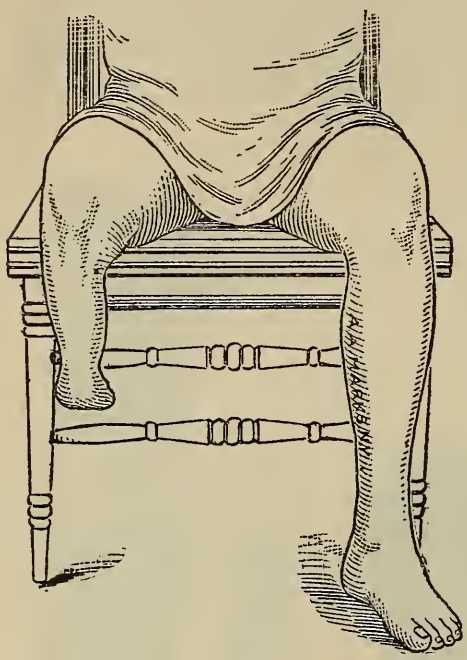
No. 790.

No. 791.

pleasant, comfortable, nor natural. They only restore length, do not support the limb nor conceal the deficiency.

Cut No. 789 represents an amputation at the ankle joint, with stump from the knee down affected with elephantasis; knee, thigh, and hip normal. An artificial leg represented by cut No. 790 was devised for the case. Cut No. 791 represents a front view of the leg. The socket was fitted to receive the leg and stump from the rear. When the stump was put in place, a leather sheath, capable of being laced with any degree of tension, surrounded both stump and socket; the sheath held the stump in the socket and applied a gradual and accommodating pressure; the thigh piece and knee joints provided additional support. A rubber foot applied to the extremity completed the structure.

Cut No. 792 represents a deformed right leg. The leg reaches to the ankle and terminates in a bony enlargement, admitting of pressure upon the extremity, the shortening amounting to eight inches.



No. 792.

No. 793.

Cut No. 793 represents a suitable leg for the same. This leg receives the deformed member in a comfortably adapted socket. A rubber foot placed at the extremity supplies the want of a foot and the deficiency in length.

No. 794.

No. 795.

No. 796.

Cut No. 794 represents a malformed right leg; hip, thigh, and knee normally constituted, the leg capable of being flexed and extended at the knee. Its length was about three-quarters that of the opposite

leg, terminating in one great toe, which grew from the external side, passing around to the front.

Cut No. 795 represents an artificial leg devised for the case. The deformed leg was received in the socket and laced in place; the toe was provided for by a protecting pocket; weight was taken partly upon the extremity. An artificial leg without knee-joints and thigh piece was applied to this case and worn for a short time. It was discovered, however, that the natural knee-joint was insufficiently strong to resist side strains, and the child was becoming "knock-kneed." Knee-joints

No. 797. No. 798. No. 799. No. 800.

and thigh support were immediately applied to the artificial leg. These parts strengthened the knee and checked further deflection.

Cut No. 796 represents the leg applied, and the child standing. Since the application of the artificial member, the child has grown rapidly in stature and weight; he has attended school, is a promising lad, enjoys good health, and engages in all the sports of his playmates.

Cut No. 797 represents a deformity similar to the above, the left leg affected instead of the right. This case was treated the same as No. 794.

Cut No. 798 represents the form of shortened leg more frequently met with, due to hip-joint trouble; knee, leg, and ankle in normal condition, needing no lateral support. Cut No. 799 represents an extension foot suitable for the case. This foot was constructed with a wooden body, fitted to receive the sole of the foot, with the toes dropped to within half an inch of the floor. A rubber heel and rubber toes were fastened to the wooden body, and the entire structure was covered with suitable leather.

Cut No. 800 represents a shoe to be worn over the extension foot.

The extension, when applied and covered by shoe, is represented in Cut No. 801. Cut No. 802 presents the appearance of the extension

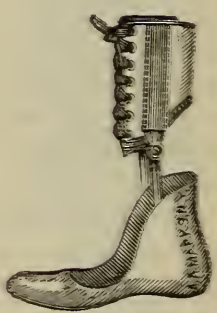
No. 801.

No. 802.

when dressed. Persons with these appliances walk much better than they do with the old style thick sole and high heel shoes, or any sort

No. 803.

No. 804.

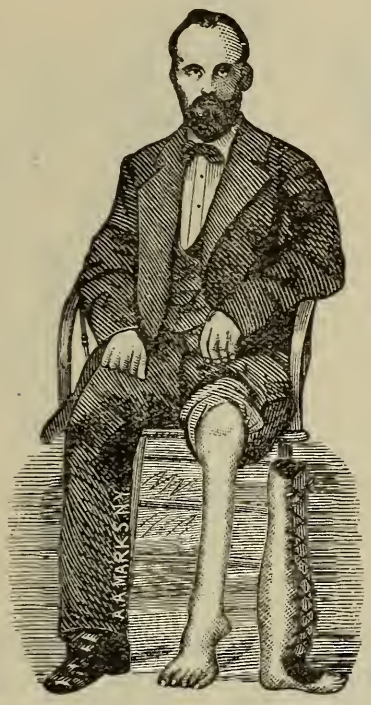


No. 805.

of appliance attached to the bottoms of shoes. In cases of *talipes equinus*, as represented in Fig. 803, a similar extension foot is applied. See Fig. 804.

In *talipes equinus* there is limited mobility in the ankle, either lateral or posterio-anterior; therefore, the simple extension attached to the bottom of the foot answers very well, but in cases where there is mobility in the ankle, and that mobility is not under control, it is necessary to encase the entire leg, as represented in Fig. 806.

Cut No. 805 represents a foot extension similar to that already described, with joints attached to the sides, which provide articulation at the ankle. The upper parts of the joints are connected to a leather corset which encases the ankle. The object of this device is to provide



No. 806.

No. 807.

a support for a shortened leg in which there is lateral weakness at the ankle, the front and back motion being normally strong.

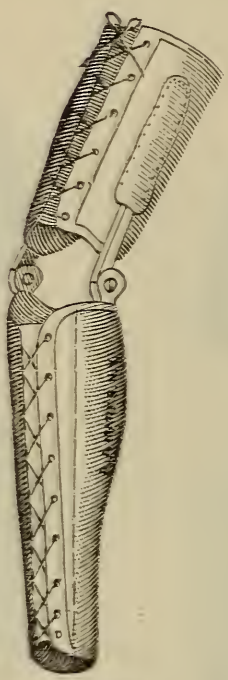
Cut No. 806 represents a case of *talipes equinus*, leg atrophied and weakened at the ankle. A suitable appliance is exhibited in the same cut. The wearer, as seen in Fig. 807, presents a natural appearance, and is capable of walking in a greatly improved manner without the use of a cane.

Cut No. 808 represents a double foot appliance devised for a special case of shortened leg. This was worn by a lady, and was found to be more pleasant and helpful than any of the innumerable appliances which she had worn during an experience of many years. The upper part is an ordinary shoe, into which the natural foot was placed. The lower part consisted of a rubber foot, securely attached to the upper shoe. Although the lady's affected leg was six inches shorter than

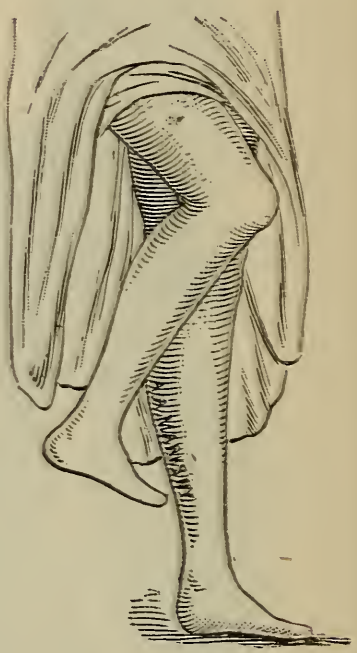
the natural leg, she had sufficient power in her ankle-joint to be able to oppose all strains that might come upon her ankle.

Resections of the knee-joints or bones of the leg necessitate apparatus of the type illustrated in Cut No. 809. The sockets above and below the knee sufficiently hold and support the parts, so that safe and painless walking can be indulged in. Apparatus of this kind are also used for weakened knees, broken patellas, or paralyzed knee muscles, and by modifications they can be adapted to a great variety of leg weaknesses. It is occasionally found desirable to put automatic knee-locks in the joints, and extensor elastic springs in front or flexor elastic springs at the rear. The knee-locks obtain rigidity when standing or

No. 808.



No. 809.



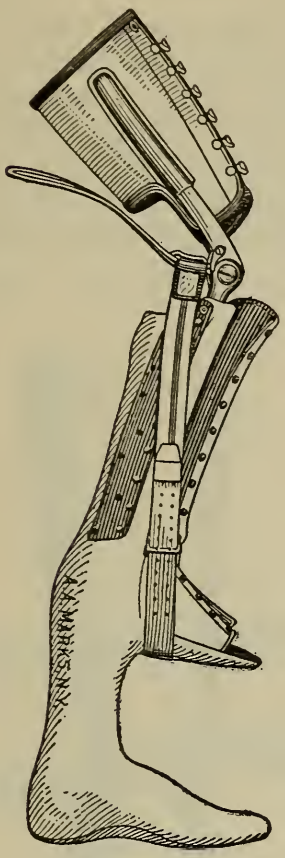
No. 810.

walking, and by moving a slide the knee can be unlocked and permitted to flex for sitting convenience.

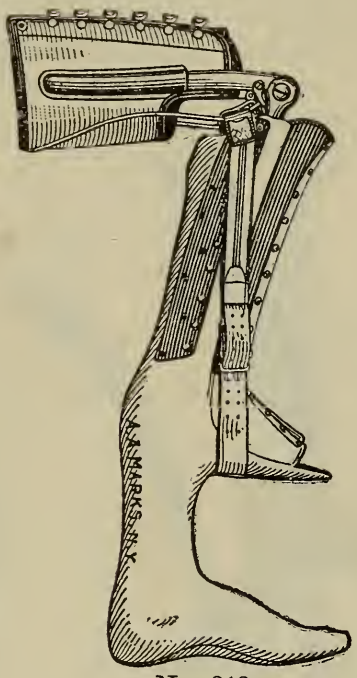
Cut No. 810 represents a shortened leg with limited motion in the knee, the knee capable of flexion, but incapable of extension beyond the angle represented in the cut; hip normal, and bottom of foot capable of enduring pressure.

Cut No. 811 represents a leg extension suitable for the case. This extension is made with a wooden socket, fitted to receive the leg. A comfortable shelf is provided for the foot to rest upon. Knee-joints, with prawl and rack and thigh piece that encase the thigh, are also provided. The prawls at the knee-joints are operated by levers which pass up the back portion of the thigh. When standing or walking, and the leg is brought to the point of greatest extension, the prawl will drop into the rack and make the leg immovable at the knee. The moment the wearer is seated, the lever will press against the seat, which

will force the prawls out of their racks and allow the knee to flex. By this means the wearer is able to walk safely with rigid knee, and



No. 811.



No. 812.

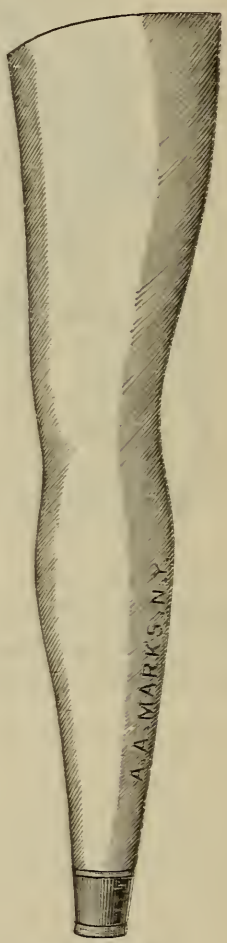
bend the knee when sitting without using her hands to operate the lock. The apparatus is provided with a rubber foot placed at the proper distance to supply the deficiency.

PEG LEGS.

The terms "peg leg," "stick leg," "pin leg," and "bucket leg," are synonymous. They designate a crude artificial leg without a foot.

In remote times peg legs were in almost general use. Peter Stuyvesant wore one in preference to the complicated mechanical leg of the seventeenth century, notwithstanding the fact that his friends besought him to forego the vulgar peg and import a luxurious artificial leg from Holland; but Stuyvesant was too cosmopolitan to heed those importunities, and preferred to cling to the commonplace "peg."

No. 813.



No. 814.

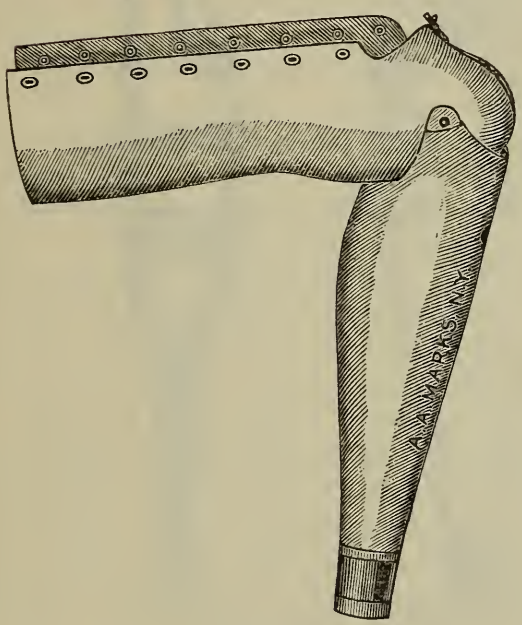
In modern times, peg legs are worn temporarily, either to bridge the impecunious period, or to serve until the stump has become more thoroughly healed.

Persons are able to stand, stump about, and perform a limited amount of labor on them, and are really better off than on crutches, but their restoration to the amplitude of their usefulness does not come until they have applied artificial legs with rubber feet.

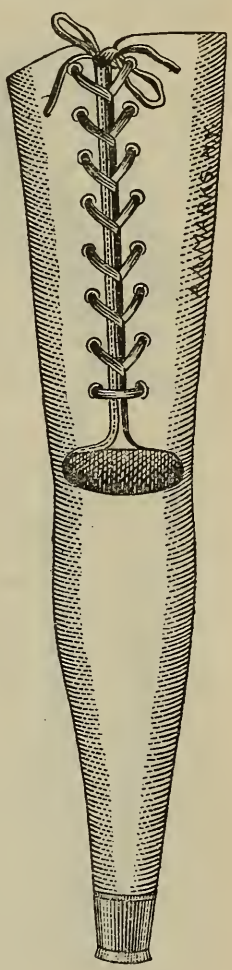
We disparage the use of peg legs, knowing as we do that they so inadequately meet the demand. When one is applied to a below knee stump, bearing is usually taken upon the knee, the stump protruding from the rear; this has a tendency to impair the knee movement.

When a peg leg is applied to a thigh stump, a socket is provided that receives the stump, and weight is taken about the ischium and perineum.

Cut No. 813 represents a peg leg with knee articulation, calculated for a thigh stump, to be worn under clothing. It is constructed of wood; the knee mechanism is the same as that described in illustration on page 43. The extremity is provided with a rubber tip. The socket



No. 815.



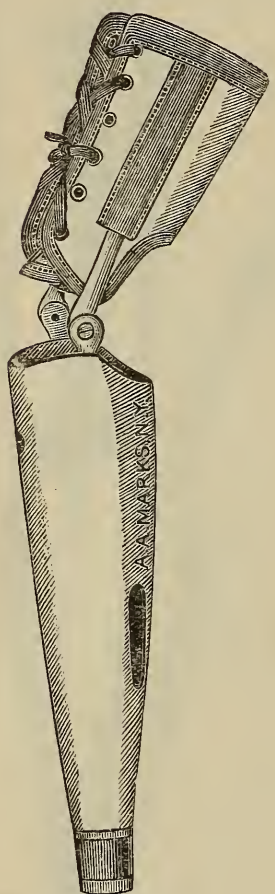
No. 816.

is excavated to receive the stump comfortably; a knee-lock is occasionally introduced in order to make the knee rigid at times.

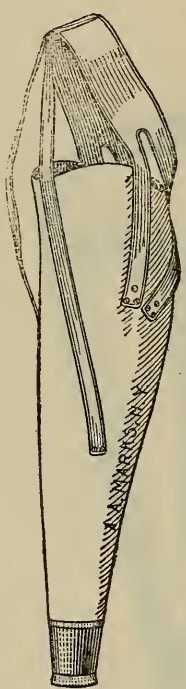
If finished elaborately, it is covered with parchment and coated with a flesh-colored waterproof enamel. If cheaply finished, it is covered with sheepskin. Price, $50 to $75, according to finish.

Cut No. 814 represents a peg leg without knee articulation. It is constructed the same as the one previously described, except that it is incapable of bending at the knee. Price $25 to $40, according to finish.

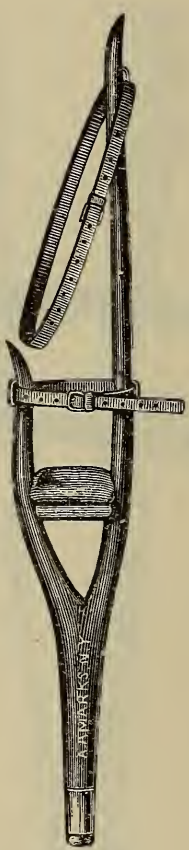
Cut No. 815 represents a peg leg for a knee-bearing stump, with knee articulation, to be worn under clothing. The upper part is made of wood and leather, fitted to receive the stump, and held in place by lacing. A pad is provided at the end of the socket on which the knee rests. The knee mechanism is illustrated and described on page 72. A knee-lock is frequently inserted to lock the knee when the leg is at extension. The lower section is constructed of wood, hollowed to reduce weight, the end terminated by a rubber tip. The exterior may be covered with parchment, elaborately enameled or finished with sheepskin to curtail cost of production. Price, from $50 to $75, according to finish.



No. 817.



No. 818.



No. 819.

Cut No. 816 represents a peg leg for a knee-bearing stump, without knee articulation, to be worn under the clothing.

Price from $25 to $40, according to finish.

Cut No. 817 represents a peg leg suitable for an amputation between the knee and ankle. It is constructed the same as No. 589 without a foot. The socket is made of wood, excavated to receive the stump. The thigh piece encases the thigh and carries part of the weight above the knee. The extremity is terminated by a rubber tip, which can be replaced when worn out. This leg can be finished elaborately or

cheaply. If well finished with hard enamel, the price is $50. Cheaply finished with sheepskin, $30.

Cut No. 818 represents a peg leg for a stump extending to a point anywhere between the knee and ankle. It is provided with straps and thigh belt instead of knee joints and thigh part. The socket must be made to fit the stump very comfortably, as the weight of the wearer is carried about the stump immediately below the knee. The end is terminated with a rubber tip. Price, elaborately finished, $30; cheaply finished, $20.

Cut No. 819 represents the usual form of peg leg to be worn on a leg stump. It consists of two wooden branches, one running up the outside and well up on the body. The other running up the inner side nearly to the crotch. These branches unite below the point of bearing, and continue to the ground, terminating with a rubber tip. A padded shelf is placed at the proper distance, on which the knee rests. Leather straps passing around the thigh, and about the body, hold the peg in place. Price, $15 each. This is considered the cheapest form of peg leg, and that which is mostly worn. It is adaptable, however, only to a stump extending to or below the knee.

It will readily be seen that the tendency of a peg leg of this character is to impair the strength of the knee and lessen its mobility. The stump being flexed and held in that position for long intervals of time invites evil consequences. We therefore strongly urge applicants to look upon this style with little favor.

Economy frequently influences the selection of the peg leg, and oftentimes induces a person to provide himself with one instead of an artificial leg with foot. We cannot emphasize too greatly the importance of obtaining and using an artificial leg with rubber foot, one that will practically remove the disability and contribute to the health of the wearer and the maintenance of the functions of the stump. The buying of a peg leg may be inexpensive, but the wearing of one entails so much sacrifice of comfort and efficiency that the question of a few dollars in the cost of purchase should not be taken into consideration.

There are thousands of impecunious persons who have succeeded in obtaining the necessary funds to purchase modern artificial legs, and we doubt that there is any person, no matter how poor he may be, who will fail in obtaining the necessary amount if he will place the facts before his friends and appeal to their humanity. His relatives, society, church, or friends are legitimate channels for him to seek aid from in any extreme emergency; pride and modesty often prevent one from resorting to these methods, but where so many benefits are at stake, the pride or modesty that interferes with the improvement of one's condition is false, unjustified, and should not prevail. The necessity of possessing a useful artificial leg is paramount to every other consideration. If the decision is finally made for a peg leg, the choice should be for that kind that combines the greater number of advantages. Let **the No. 819 style be the last choice.**

RUBBER FEET ATTACHED TO OLD ARTIFICIAL LEGS.

We have endeavored to show in a convincing way the advantages of our rubber feet over those made of wood. We have presented the points of merit and demerit in both, and leave the matter with the reader to draw his own conclusions.

As artificial legs manufactured with wooden articulating feet are always more or less troublesome and expensive to keep in order, and as they do not furnish the requisite propulsive power in walking, it is deemed advisable to point out a means by which a change can be made that will make the old leg far more advantageous.

We have devised methods by which we can remove the wooden feet of artificial legs of any construction, and put rubber feet on in their places. This substitution has proved to be of value to those of moderate means who have invested their money in a limb that does not fully meet the requirements. No matter how a leg may be constructed or of what material it is made, a rubber foot can be applied. Our charge for removing an old foot and putting on a new rubber one, using the other parts of the leg, is $20.00 in each case. We guarantee a connection that will be strong and lasting.

We can accommodate the wearer with a foot of any size, and can make the leg any desired length.

This matter of attaching rubber feet to artificial legs of other construction than our own, is an accommodation that works to the interest of the wearer. It is also a plan by which the merits of the rubber foot can be put to a test without purchasing an entire new leg.

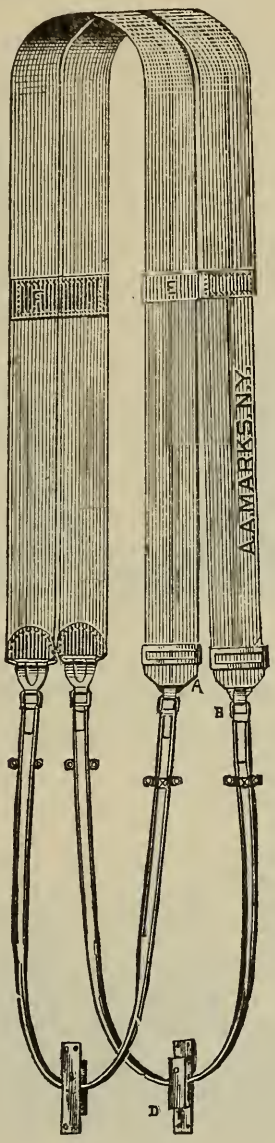
We do not advise persons to have rubber feet attached to their old artificial legs, unless the fittings of the sockets are comfortable and proper, and the knee-joints in fairly good condition.

Satisfaction will not be obtained in an experiment of this kind unless the stump is accommodatingly received in the socket and unless the rubber foot is placed on the leg at a proper angle and in perfect alignment. It is hardly possible that a cabinet-maker, carpenter, or mechanic, no matter how skillful he may be, but not familiar with artificial leg building, will be able to attach a rubber foot on proper angles so that the leg will pose correctly and enable the wearer to balance without effort. The ability to make the connection properly comes from experience. We therefore dissuade persons from buying rubber feet only, expecting to put them on their artificial legs themselves or having some wood-worker at home do it for them.

Artificial legs must invariably be sent to us to have rubber feet attached. We will keep them only three days, which is the time required to make the change.

SUSPENDERS.

All artificial legs applied to thigh, knee, or leg stumps, should be provided with suspenders, or means of support from the shoulders or about the waists. Suspenders are absolutely necessary in most cases; in some they are merely helps for beginners, and are soon discarded. We therefore apply them to every artificial leg that we manu-



No. 820.

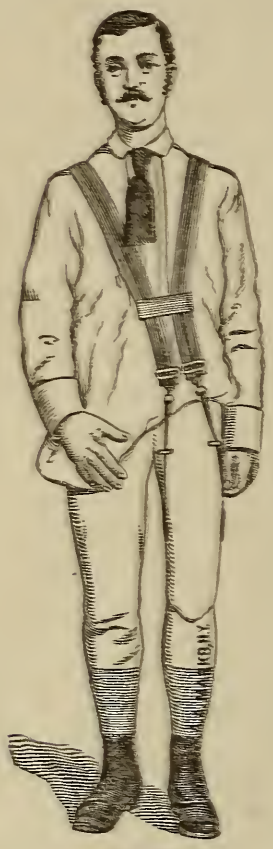
facture, except those that are applied to ankle-joint and partial-feet amputations.

When a person has become inured to a peculiar form of suspenders, and prefers to continue in its use, we will, upon his request, put that style on the leg he is ordering; if the making of it does not entail an unreasonable expense there will be no additional charge.

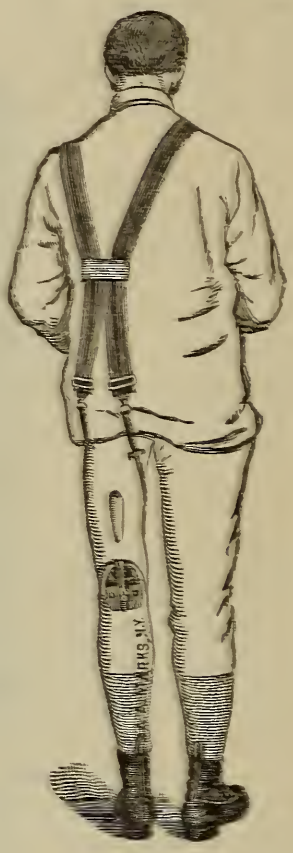
The roller suspenders herein described are the results of many experiments, and the kindly suggestions of our patrons.

Cut No. 820 represents a roller suspender, as designed for a leg to be applied to any thigh stump, six or more inches in length.

The shoulder straps are of two-inch non-elastic webbing. A strip of webbing (E) is attached to the right strap, and forms a loop through



No. 821.



No. 822.

which the left strap passes. A piece of webbing (F) stitched to the backs of both straps holds them together. The front lower ends of the shoulder straps are received into buckles, and the back lower ends are terminated by snaps: each hooks into the ends of the roller straps which pass around rollers that are attached to either side of the leg. Any degree of pressure upon the shoulders can be obtained by regulating the front shoulder straps by means of the clamp buckles. When the proper degree of pressure is obtained, the buckles are clamped, and are never disturbed, unless the pressure on the shoulder needs to be further regulated. When it is desired to remove the limb, the suspenders are detached by unsnapping.

Cut No. 821 presents a front view of a person wearing a pair of roller suspenders for the support of a leg for a thigh stump.

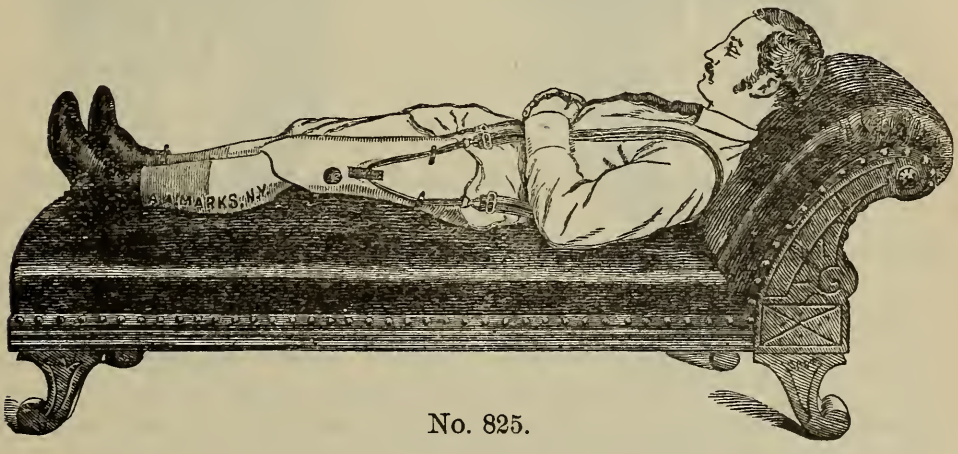
Cut No. 822 represents the back view. These cuts show the relative

positions of the rollers on front and back sides of the socket, also the effect of the front loop in holding the shoulder straps in place and the

No. 823.

No. 824.

direction given to the shoulder straps by means of the back cross piece. Elasticity is obtained by two short pieces of elastic webbing attached

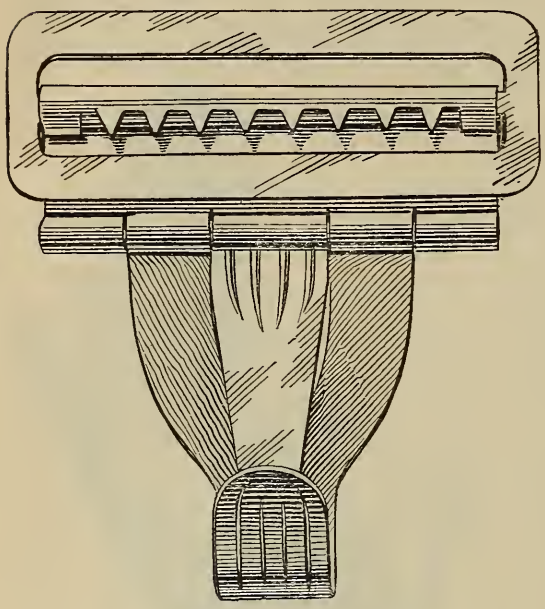


No. 825.

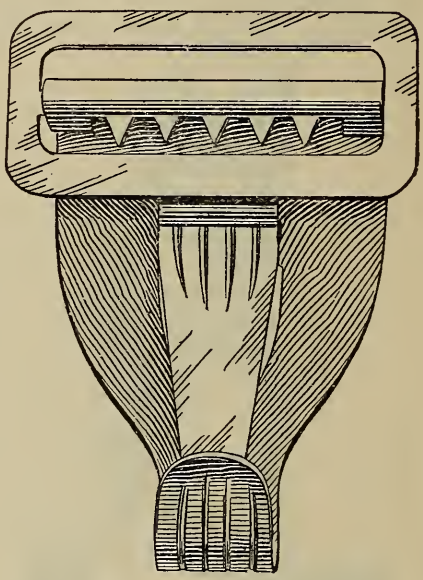
to the backs of the shoulder straps at the place where they are connected and extend to the snaps to which they are attached.

The action of the suspenders is illustrated in Cuts Nos. 823 and 824. All the motion resulting from changes of position takes place about

the rollers on the sides of the thigh, instead of on the shoulders of the wearer, where they remain immovable, whether the person is standing, stooping, walking, sitting, or lying.

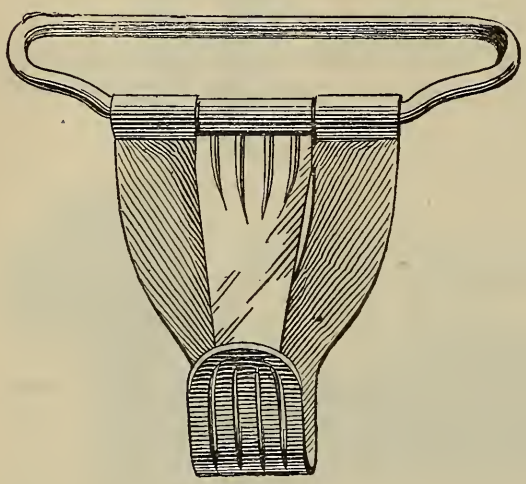


No. 826.

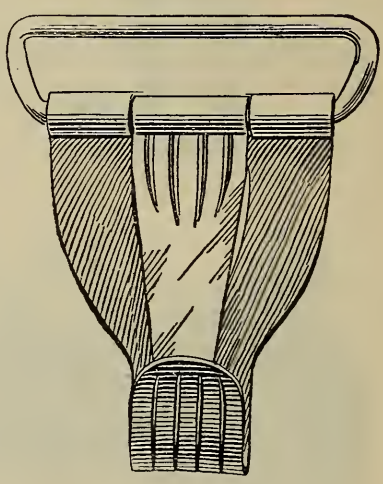


No. 827.

Cut No. 825 represents the wearer lying on a couch at full length. From a standing to a sitting posture, or from stooping to erect positions the straps roll over a large range, while the shoulder straps have not



No. 828.



No. 829.

moved from their places on the shoulder; all the "let and take up" has been about the rollers.

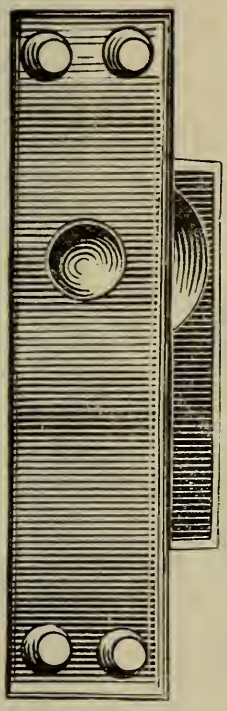
Price per pair, complete, $4.00.

The measurement required is the distance from the top of the leg in front, over the opposite shoulder to the top of the leg at the back.

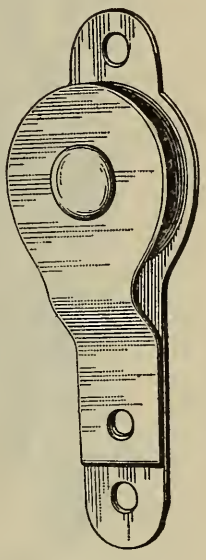
Cut No. 826 represents a clamp, buckle, and spring snap combined;

full size, 2 inches. Cut No. 827 represents the same in smaller size, 1½ inches. This buckle is especially gotten up for suspenders for artificial limbs. It clamps the webbing without danger of cutting; the spring snap admits of rapid attachment to the metal loops at the ends of the roller straps. These combined buckles and snaps are used at the fronts of nearly all suspenders.

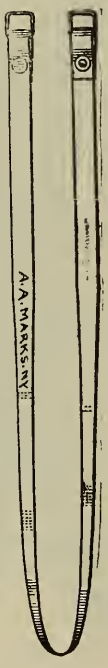
Cut No. 828 represents a single snap, which is attached to the backs of many styles of suspenders; full size, 2 inches. Cut No. 829 represents the same, 1½ inches wide. Buckles and snaps are made of strong rolled brass, nickel-plated, so as not to be affected by perspiration.



No. 830.



No. 831.



No. 832.

Price: combination buckle and snap, 25 cents each; single snap, 15 cents; in either size.

Cut No. 830 represents a roller used in connection with the roller suspenders heretofore described.

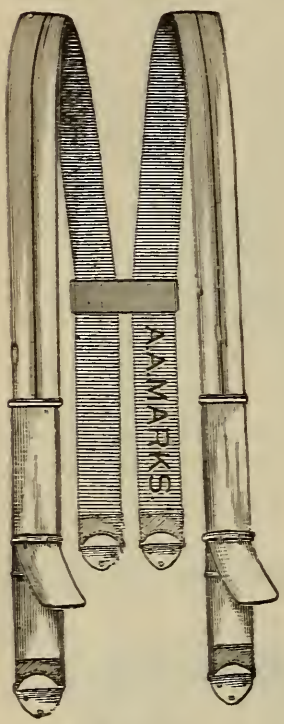
Cut No. 831 represents roller for the same purpose, but of smaller dimensions and of lighter weight. These rollers are secured to the sides of the thigh pieces, and admit of the straps passing through them. The frames are made of brass, and the pulleys of wood or hard rubber. This combination does not require lubrication and is free from noise.

Price of either size, 25 cents each, or 50 cents per pair.

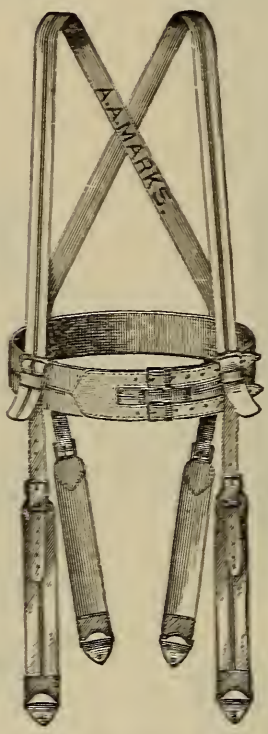
Cut No. 832 represents a roller strap, made of strong leather, especially prepared. Each end terminates with a square metal loop.

Price each, 25 cents, or 50 cents for the pair.

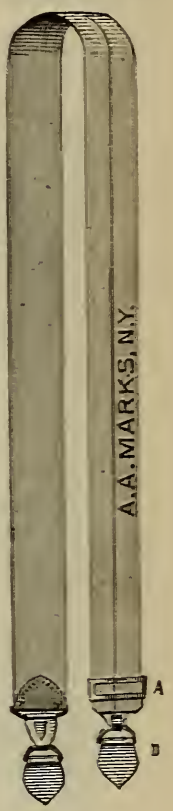
Cut No. 833 represents a style of suspender that is especially adapted to artificial legs with short thigh stumps. It is also the style that was generally used before the roller suspenders were devised. The shoulder straps are of fine elastic webbing, 2 inches wide. The front straps are of 2-inch non-elastic webbing; each front strap passes through a metal link, which is attached to the elastic shoulder strap. After passing through the metal link the front straps are received into an ordinary suspender buckle. The suspenders are attached to the leg by means of leather tags and metal D's, screwed to the back and the



No. 833.



No. 834.



No. 835.

front of the leg. These metal D's admit of side motion, so as to insure direct pull.

Price per pair, $3.00.

Measurement required is the distance from top of leg at front, over the shoulder to top of leg at back.

Cut No. 834 represents a belt and suspender combined. The shoulder straps and belt are preferably of non-elastic webbing. Straps running from the belt to the leg are made of elastic webbing. The webbing used in this style of suspender is of 2-inch or 1½-inch widths, as the case may demand.

Price, suspender complete, $5.00.

Measurements required are the distance from the top of leg at front, over the shoulder, to top of leg at back; also the girth measurement.

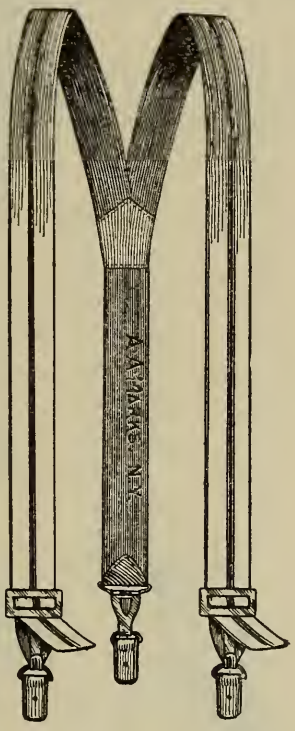
Cut No. 835 represents a single suspender, calculated for a leg for

amputation below the knee, and also for knee-bearing legs. The shoulder strap is of 2-inch elastic webbing. The front strap is buckled to a combination buckle. The back of the strap is terminated by a simple snap. Both are snapped into metal D's secured to the front and the back of the thigh of the leg. This suspender can be adjusted by the buckles so that the proper pressure will be brought upon the shoulder. When it is desired to disconnect the suspender from the leg, it is simply unsnapped.

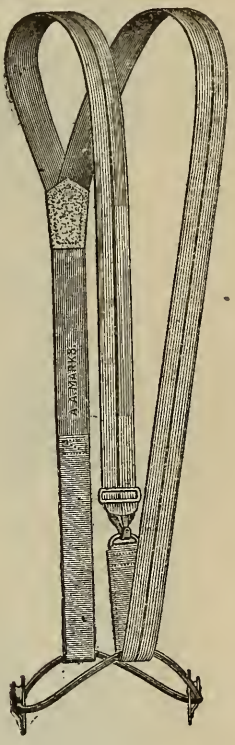
Price $1.50 each.

Cut No. 836 represents a single suspender calculated for the same

No. 836.



No. 837.



No. 838.

purpose as No. 835. The suspender works on buttons secured to the thigh piece, front and back.

Price $1.50 each.

Cut No. 837 represents a double suspender for below the knee or knee-bearing leg; the weight is divided over both shoulders. The back is made of 2-inch elastic webbing, the shoulder suspenders are of 1½-inch non-elastic.

Price each $2.00.

Cut No. 838 represents a roller suspender designed for a knee bearing or below the knee leg. Rollers similar to No. 831 are placed one on each side; on the thigh a continuous strap passes through them to this strap; the shoulder braces are connected; elastic webbing is on the rear which is capable of being adjusted; non-elastic webbing passes over each shoulder which is also capable of adjustment.

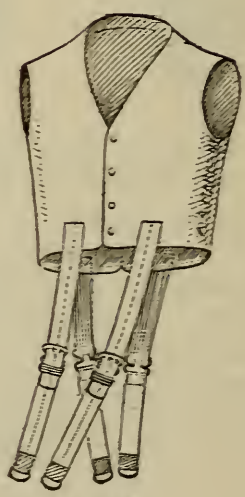
Cut No. 839 represents the front view of a person with these sus-

penders applied. Cut No. 840 represents a rear view of the same, and Cut No. 841 represents the same in side view with wearer seated.

No. 839.

No. 840.

No. 841.



No. 842.

Price per set, complete, $3.00.

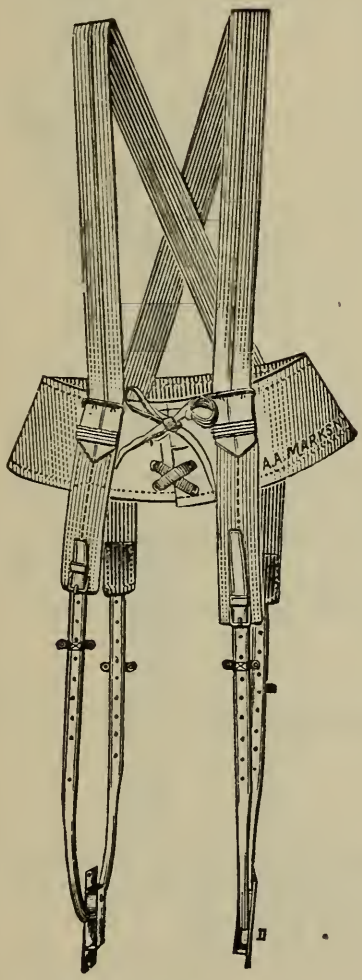
Cut No. 842 represents the vest method. It is made of strong muslin, fitted to the person and worn under the shirt. Elastic straps

are attached to the lower part of this vest, and buckle into straps that are attached to the leg.

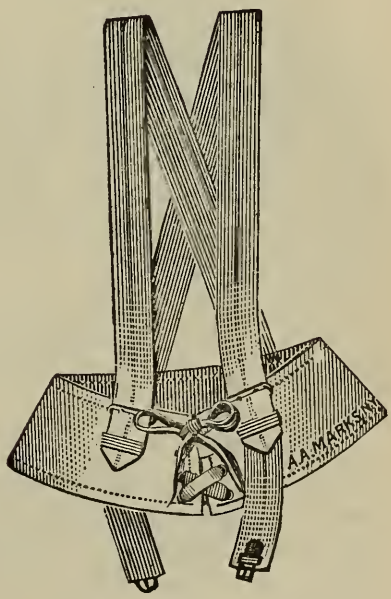
In order to obtain the best results, the vest must be made and fitted to the person by a tailor. Persons who desire to have their artificial limbs constructed from measurements, and choose the vest suspender, are required to have the vests made at home, and if sent to us, we will attach the straps and make the proper connections with the leg without additional charge.

SUSPENDERS FOR WOMEN.

For obvious reasons the means of suspending artificial limbs to women differ from those employed with men. When shoulder straps are used they must pass over the shoulders and not press upon the



No. 843.



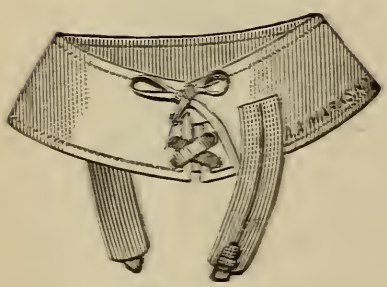
No. 844.

breasts. Yokes, girths, or bands must pass around the waists so as to take the burden as much from the hips as the shoulder.

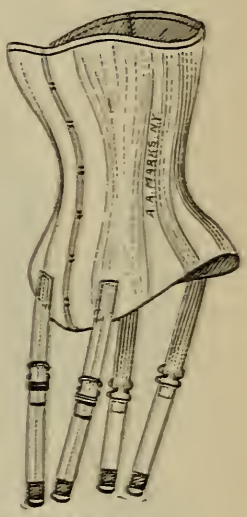
Cut No. 843 represents an excellent style of suspender to be worn by a woman who wears an artificial leg for a thigh amputation. This suspender is provided with shoulder straps, and a yoke that passes around the waist, resting on the hips. Roller straps are connected with the yoke, which pass around rollers attached to the sides of the thigh of the artificial leg. The yoke is adjustable by lacing in front or on the sides, as may be preferred; the shoulder and roller straps are also adjustable, so as to bring the proportionate weight about the shoulders and hips without displacing the yoke.

Price of this suspender, complete, $5.00.

A pattern made of cloth or paper should be fitted to the person about the hips, and sent to us. The yoke for ordinary cases is 4 inches wide; narrower for smaller persons.



No. 845.



No. 846.

Cut No. 844 represents a yoke suspender with shoulder straps, calculated for a knee-bearing leg or a leg for amputation below the knee. From the yoke up, this suspender is constructed the same as that previously described. The manner in which the leg is connected is by means of elastic straps attached to the yoke. These straps buckle into attachments connected with the thigh piece of the artificial leg.

Price each, $3.00.

A pattern of yoke required.

Cut No. 845 represents a yoke without shoulder straps. This style is preferred by women who have broad hips.

Price each, $2.00.

Yoke pattern required.

Women frequently prefer supporting their artificial limbs from their corsets, connected by elastic straps as represented in cut No. 846. There is no objection to this method; in fact, it is advised.

As many women pride themselves upon their trim waists and neat-fitting garments, it is all the more desirable that means of leg suspension should be light and neat. Straps securely sewed to the corset, extending downward and connected with the artificial limb, dispense with a vast amount of bulk.

SUSPENDERS FOR DOUBLE AMPUTATIONS.

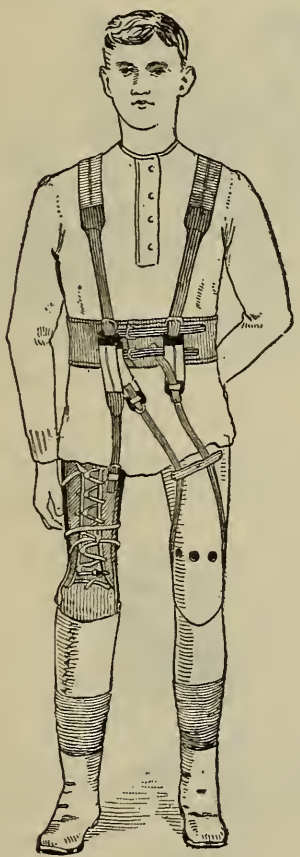
Any of the suspenders described can be so modified as to be adaptable when two artificial legs are worn.

Price, style No.	820,	modified	for	double	amputations,	.		$5.00
" " "	835,	"	"	"	"	.		3.00
" " "	843,	"	"	"	"	.		7.00
" " "	844,	"	"	"	"	.		4.00
" " "	845,	"	"	"	"	.		3.00

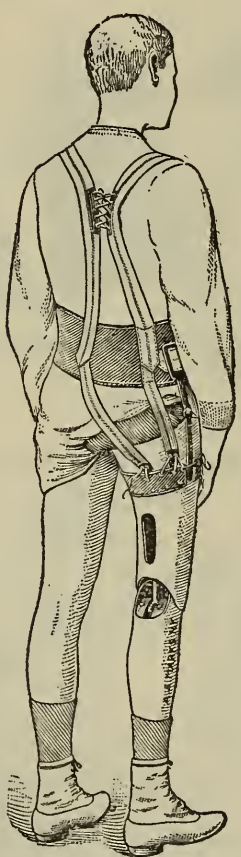
In ordering suspenders, the style selected should be designated by the number. All new artificial legs are furnished with suspenders of suitable styles, without additional charge.

Cut No. 847 represents a style, No. 834, suspender modified for double amputations.

This style is more generally adopted for double amputations than any other.



No. 847.



No. 848.

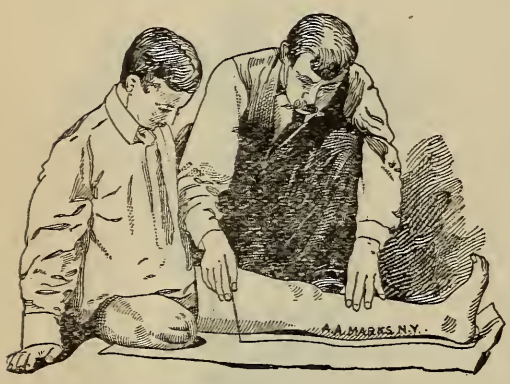
Cut No. 848 represents a style of suspender usually applied to legs for very short thigh stumps. Price $5.00.

DIRECTIONS FOR TAKING MEASUREMENTS AND DIAGRAMS FOR ARTIFICIAL LEGS.

The system of taking measurements is simple, and can be understood by anyone. After reading the following instructions carefully, the simplicity of the process will be apparent. It is calculated that a person needing an artificial leg can, with the aid of a member of his family, take all the measurements and diagrams required, and not feel the necessity of going to the manufacturer or requiring the manufacturer to send a skilled person to him.

THIGH STUMP.

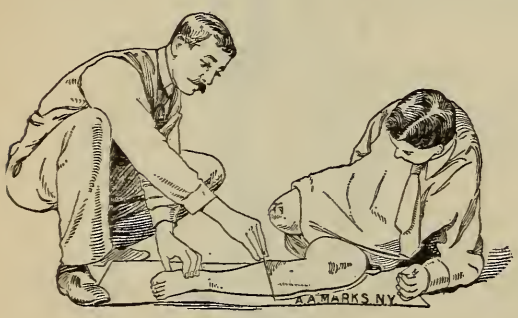
Place a sheet of smooth paper (about twenty inches wide by thirty-six inches long) on a smooth floor or on a table. Remove all clothing from sound leg and stump. Be seated on this paper. Be careful to



No. 849.

No. 850.

have the foot pointed directly upward. Begin at the body, draw a pencil down the outside of the leg, then around the heel, then up



No. 851.

No. 852.

the inside, as represented in Cut No. 849, continue to the crotch; then down the inside of stump, around the end, up the outside, as represented in Cut No. 850; continue to the hip. The pencil should be held upright to insure accuracy. Bend the knee at right angles and lie on

the sound leg side. Draw a pencil around the entire leg, from groin down the thigh, down the leg, as represented in Fig. 851; continue around the foot, up the calf and thigh. Turn to the opposite side, see Cut No. 852, and draw a pencil around the stump, from body around

No. 853.

No. 854.

the end and up the rear. Be seated in a chair, place the foot flat on the paper and mark around it, as represented in Fig. 853.

These drawings, if correctly taken, will be similar to those represented in Cuts Nos. 854, 855, 856, and 857.

No. 855.

No. 856.

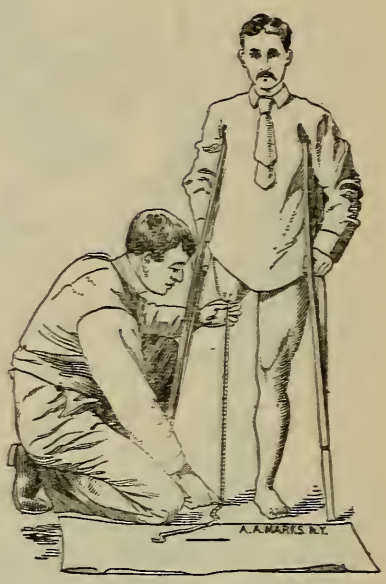
No. 857.

No. 858.

Stand erect, supported by crutches, take a tape line and measure the distance from the perineum, or body, to floor, as represented in Fig.

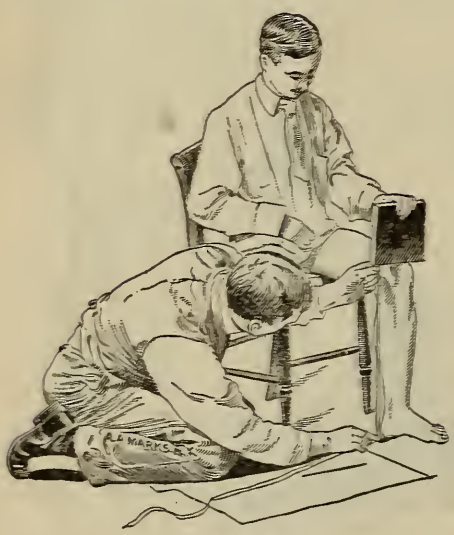
858. Measure the distance from the body to the end of the stump, as represented in Fig. 859. Measure the distance from the end of the stump to the floor, as represented in Fig. 860. Be seated on a chair

No. 859.



No. 860.

low enough to make the thighs level, measure the distance from the top of the knee to the floor, as represented in Fig. 861. Measure the



No. 861.

No. 862.

distance from the under side of the thigh, or popliteal space, to the floor, as represented in Fig. 862.

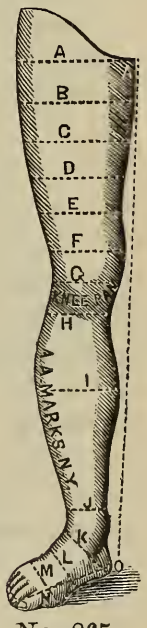
Pass a tape line horizontally about the sound thigh close to the body; draw it moderately tight, as represented in Fig. 863. In this manner

No. 863.

No. 864.

obtain all the lengths and circumferences of sound leg indicated by dotted lines in Fig. 865.

Length from body, or perineum, to floor, . .	A O
Circumference around leg, close to body, . .	A
" 2 inches below body, . .	B
" 4 " " . . .	C
" 6 " " . . .	D
" 8 " " . . .	E
" 10 " " . . .	F
Lateral diameter through center of knee (that is, the distance through the joint from the interior to the exterior), ...	G
Circumference just below knee-pan, . . .	H
" calf of leg, ...	I
" smallest part of ankle, . .	J
" around heel and instep, . .	K
" around instep, ...	L
" foot at toe-joints, . . .	M
Length of foot, ...	N



No. 865.

Pass the tape line around the stump close to body. Draw it moderately tight, as represented in Fig. 864. Repeat the circumference of the stump at intervals of two inches, or at places indicated by the dotted lines in Fig. 866. All these figures should be placed at their relative places on the diagrams of sound leg and stump, or written on separate paper.

No. 866.

Length from body to end of stump, . . .	A P
Circumference around stump close to body, .	A
" 2 inches below, ...	B
" 4 " "	C
" 6 " "	D
" 8 " "	E
" 10 " "	F
Length from the end of stump to the floor, .	Q Q

Measurements of the stump should never be taken when the stump is swollen.

The following proofs may be applied to test the accuracy of the length :

Add the length of the stump (from body to end) to the distance from the end of the stump to the floor, and compare the results with the distance from the body to the floor of the sound leg. They should be equal. In other words, referring to letters on Figs. 865 and 866, AO should equal AP plus QG.

Answer the following questions:

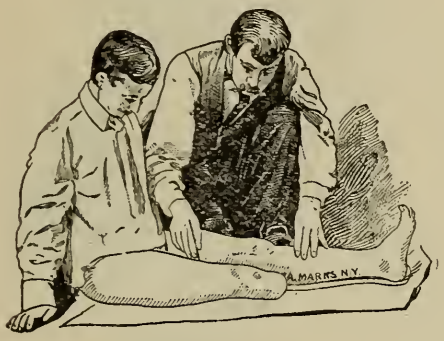
Name of patient ? Post office address ? Occupation ? Age ? Weight ? Cause of amputation ? When was amputation performed ? Which limb amputated ? Has the patient worn an artificial leg ? If so, of whose make ? How long ? Name of the party ordering the leg ? His address ? Is the leg to be made and fitted in the absence of the patient ? To what address shall it be shipped ?

KNEE-JOINT STUMP.

If the stump extends to the knee articulation, the measurements and diagrams required of sound leg as well as stump, are the same as those required for a thigh stump; therefore the instructions on pages 178 to 182 should be followed. If it is desired to bear weight upon the extremity of the stump, and if the end of the stump is uneven and tender in spots, a plaster cast should be made and sent with the order. Methods of taking plaster casts are explained in their order: consult index.

BELOW-KNEE AND KNEE-BEARING STUMPS.

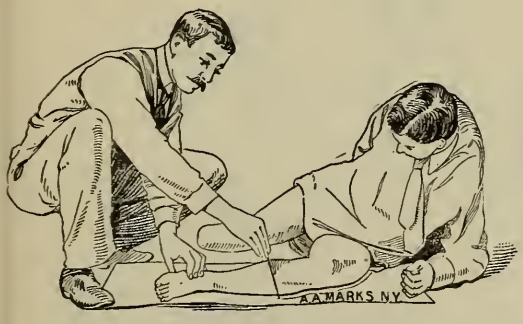
If the stump extends below the knee to any point above the ankle, the following directions should be followed: Place a sheet of smooth paper about twenty by thirty-six inches on a smooth floor or table. Remove all clothing from the sound leg and stump. Be seated on the paper. Be careful to have the foot pointed directly upward. Begin at



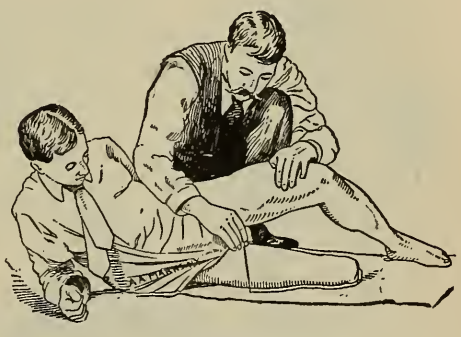
No. 867.

No. 868.

the body, draw a pencil down the sound leg from the hip to and around the heel up to the crotch, as represented in Cut No. 867. Draw the pencil entirely around stump, beginning at the crotch and passing down the thigh and stump, around the end, up the exterior side to the body, as shown in Cut No 868. The pencil should be held perpendicularly to in-



No. 869.



No. 870.

sure accuracy; when passing up the interior of the sound leg and stump it should be carried close to the crotch. Bend the knee at right angles and lie on the sound leg side. Draw the pencil around the entire leg from groin down the thigh, down the front of the leg, around the foot, up the calf and thigh, as represented in Fig. 869. Turn to the opposite

or amputated side and draw a pencil around the thigh and stump when the stump is at full extension, as represented in Fig. 870. Without changing the position of the body, bend the knee so that the stump will be at right angles with the thigh, then draw a pencil from body around the thigh and stump. Be seated on a chair, place the foot flat

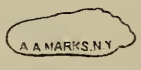
No. 871.

No. 872.

on a paper and mark around it, as represented in Fig. 871. These drawings should be similar to those represented in Figs. 872, 873, 874, and 875. Stand erect, supported by crutches. Take a tape line and measure the distance from the perineum or body to the floor, as represented in Fig. 876. Measure the distance from the body to the

No. 873.

No. 874.



No. 875.

end of the stump, as illustrated in Cut No. 877. Measure the distance from the end of the stump to the floor, as represented in Cut No. 878. Be seated in a chair low enough to make the thighs level. Measure the distance from the top of the knee to the floor, as represented in Fig. 879. Measure the distance from the under side of the thigh, or popliteal space, to the floor, as represented by Cut No. 880. Measure

the distance from under side of thigh, or popliteal space, to the end of the stump. Stand erect and measure the circumference of the

No. 876.

No. 877.

thigh of the sound leg close to body, as represented in Cut No. 881.

Pass the tape line around the thigh of the amputated limb, close to

No. 878.

No. 879.

the body; draw it snugly, as represented in Fig. 882. In like manner take all the measurements of both legs called for in Figs. 883 and 884.

If a knee-bearing leg is required, give, in addition to all the meas-

urements and diagrams above called for, the distance from the under side of flexed knee to the floor, when hips are level.

All the measurements, lengths, and circumferences should be placed

No. 880.

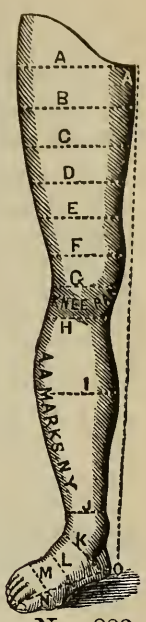
No. 881.

in plain figures at their relative places on the diagrams, or written in full on a separate paper.

No. 882.

All the lengths and circumferences of sound and amputated legs that are required are indicated by the dotted lines in Cuts Nos. 883 and 884, and may be tabulated as follows:

Length from body, or perineum, to floor, . . AO
Circumference around leg, close to body, . . A
" 2 inches below body, . . . B
" 4 " " C
" 6 " " . . . . D
" 8 " " . . . . E
" 10 " " . . . . F
Lateral diameter through center of knee (that is, the distance through the joint from the interior to the exterior), ... G
Circumference just below the knee-pan, . . H
" calf of leg, ... I
" smallest part of ankle, . . J
" around heel and instep, . . K
" " instep, ... L
" foot at toe joints, . . . M
Length of foot, ... N



No. 883.

Length from body to end of stump, . . . AT
Circumference around stump, close to body, . A
" 2 inches below, ... B
" 4 " " C
" 6 " " . . . . D
" 8 " " . . . . E
Circumference at the smallest place above the knee, F
Lateral diameter through center of knee, . . G
Circumference at lower edge of knee-pan, . . O
" 2 inches below, ... H
" 4 " " I
" 6 " " . . . . J
" 8 " " . . . . K
" 10 " " L
" 12 " " . . . . M
Length of stump below knee, measured from back of knee (when bent at right angles) to end.
Distance from end of stump to floor, . . . TO

No. 884.

Measurements should never be taken when the stump is in a swollen condition.

The following proofs may be applied to verify the lengths:

Add the distance from the body to the end of the stump to the distance from the end of the stump to the floor. The sum should be equal to the length of the sound leg from the body to the floor; or, referring to the small cuts, Nos. 883 and 884, AO should be equal to AT plus TO.

The distance from the popliteal space to the end of the stump, added to the distance from the end of the stump to the floor, should

be equal to the distance from the popliteal space of the sound leg to the floor.

Answer the following questions:

Name of patient? Post office address? Occupation? Age? Weight? Cause of amputation? When was amputation performed? Which limb amputated? Has the patient worn an artificial leg? If so, of whose make? How long? Name of the party ordering the leg? His address? If the leg is to be made and fitted in the absence of the patient, how shall it be shipped, and to what address?

ANKLE-JOINT OR PARTIAL FOOT STUMPS.

If it is decided to apply an artificial leg to a stump extending to the ankle or in the body of the foot, the artificial leg to have knee-joints and thigh support, it will be necessary to take all the diagrams and measurements called for on pages 183 to 187; but if an artificial leg without knee-joints and thigh support is to be used, it will not be necessary to take diagrams or measurements of either thigh. Those of sound and amputated legs from the knees down will suffice.

In addition to the measurements and diagrams, a plaster cast of the amputated limb, from the knee to the extremity of the stump, should be made.

Methods of taking plaster casts are explained in other parts of this book: consult index.

MEASUREMENTS AND DIAGRAMS REQUIRED WHEN BOTH LEGS ARE AMPUTATED.

If both legs are amputated above the knees or in the knee-joints, or if one leg is amputated above the knee and the other in the knee, front diagrams of each stump should be made, as represented in Cut No. 850, page 178, and side diagrams of each stump, as represented in Cut No. 852, page 178.

The patient is to be seated on a sheet of paper, as shown in Cut No. 850. A pencil is to be carried perpendicularly down the outside of left stump, around the end: then up the inside to the crotch: then down the inside of right leg, around the end, up the outside, to the hip. The patient should then turn to the right side, with outside of the right stump resting on the paper. Carry the pencil perpendicularly down the front of the right stump, from groin to end; then around the end, and up the back to the buttock; the patient should then turn to the left side, and a side diagram of the right stump be taken in the same manner.

The length of each stump, from crotch to the end, should be taken by the tape line. Circumferences should then be taken; first, close

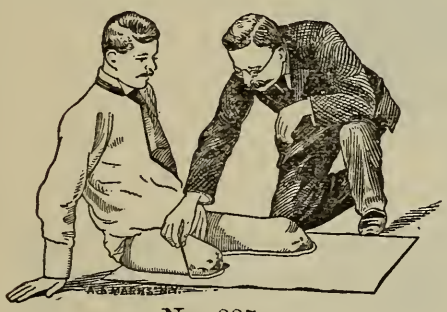
to body, on a plane with the crotch; second, two inches below the crotch; third, four inches below. In this manner, the circumferences of each stump should be taken at intervals of about two inches. These lengths and circumferences should be written on the diagrams in their respective places.

Answer the following questions:

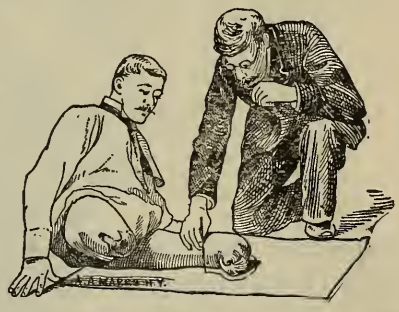
Name of patient? Post office address? Age? Occupation? Weight? Cause of amputation? When was each leg amputated? Has the patient worn artificial legs? If so, of whose make? How long? Name of the physician or party ordering the legs? Are the legs to be made and fitted from measurements, in the absence of the wearer? To what address shall they be shipped?

ONE LEG AMPUTATED ABOVE OR IN THE KNEE, AND THE OTHER BELOW THE KNEE.

The diagrams required when one leg is amputated above or in the knee, and the other below the knee, are the following: First, front diagrams of both legs; this can be done by placing the subject on a sheet of paper thirty-six inches long and twenty inches wide, both limbs naked, mark around each in the following manner: Beginning at the hip of the left leg, carry the pencil down the left side, around



No. 885.



No. 886.

the end, up the inside to the crotch, then down the inside of the right limb, up the outside, as represented in Cut No. 885. Let the patient lie on his long stump side so that the outside will rest on the paper, draw a pencil around that limb from the groin down the front, around the end of the stump, up the back to the buttock. This diagram should be made with the stump extended and also with the stump flexed, as represented in Cut No. 886. Let the patient lie on the short stump side, carry the pencil down the front of the leg from the groin to the end, around the end and up the back to the buttock, as represented in Cut No. 887.

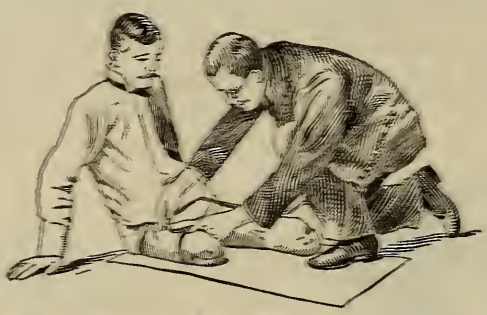
The measurements required are as follows: The distance from the body or crotch to the end of each stump; this can be taken by a tape

line. The distance from the popliteal space (or back of knee) to end of long stump. The circumferences of each thigh and stump, as represented in Cuts No. 888 and 889, beginning at the thigh and repeating at intervals of two inches. These measurements and circumferences

No. 887.

No. 888.

should be marked in their relative places on the paper containing the diagram. Answers to the following questions should also be placed on the paper: Name of patient? Post office address? Age? Occupation? Weight? Cause of amputation? When were legs amputated? Has



No. 889.

the patient worn artificial legs? If so, of whose make? How long? Name of the physician or party ordering legs? Are the legs to be made and fitted from measurements in the absence of the wearer? To what address are they to be shipped?

BOTH LEGS AMPUTATED BELOW THE KNEES.

The diagrams required in case both legs are amputated below the knees are as follows: Front diagrams of each thigh and stump, which are made by having the patient seated on a sheet of paper thirty-six inches long by twenty inches wide, with both limbs naked, then mark around each in the following manner: Start at the hip of the left leg, carry the pencil down the outside, around the end, up the inside to the body, down the inside of the right leg. See Cut No. 890. Around the end, up the outside to the hip. Let the patient lie on the right side,

mark around the stump and thigh, thus obtaining a side diagram of that leg; this diagram should be made twice, first, with the stump extended, and second, with it flexed at right angles, as represented in Cut No. 891. Then let the patient lie on the left side and mark around thigh and stump, showing a side view of the same. This diagram should also

No. 890.

No. 891.

be taken twice, first, with the stump extended, second, with the stump flexed at right angles, as represented in Cut No. 892. Circumferences of each thigh and stump should be taken, beginning on a line directly around the thigh close to the crotch, repeating at intervals of two inches, as represented in Cuts No. 893 and 894. These measurements should be placed at their relative places on the diagrams. The length of each stump from the crotch to the end, also the length of each from

No. 892.

the popliteal space (or back of knee) to the end of the stump, should be taken and marked on the diagrams.

If it is desired to make the artificial legs of sufficient length to elevate the wearer to a given height, it will be necessary to give the length from the top of head to the end of long stump, which can be obtained by the patient lying on his back at full length, and measuring by the tape line the distance required.

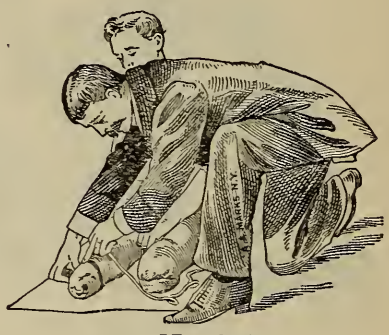
Answers to the following questions should be placed on the diagrams:

Name of patient? Post office address? Age? Occupation? Weight? Cause of amputation? When was each leg amputated? Has the patient

worn artificial legs? If so, whose make? How long? Name of the physician or party ordering the legs? Are the legs to be made and fitted from measurements in the absence of the wearer? To what address are they to be shipped?

If both legs are amputated in the ankle-joints or in the feet, all the measurements and diagrams called for under the head of "Both

No. 893.



No. 894.

Legs Amputated below the Knees," should be given. If artificial legs are to be applied that do not extend above the knees, it will not be necessary to send any measurements or diagrams of the thighs of either leg. Plaster casts are only required of stumps that extend to the knee-joints, ankle-joints, or stumps that result from partial foot amputations. Instructions for taking plaster casts are explained in other parts of the book.

THE IMPORTANCE OF APPLYING ARTIFICIAL LEGS TO YOUNG AND GROWING CHILDREN.

The first thought that comes to the parents of a crippled child is the improvement of the child's condition; what can be done to protect the injured parts; to make the child less dependent on others; to enable him to get about and share the enjoyments of childhood as other children do, and thus mitigate his disabilities? The thought then obtrudes itself, that the child is young and growing, and that an artificial leg will, on account of his growth and development, soon become outgrown and unsuitable, and that the expense of renewing or remodeling will be more than the benefits will justify or the financial abilities of the parents permit. Will it not be better to wait until the child has attained his full growth? Parents are naturally solicitous for the welfare of their offspring, and are willing to meet any reasonable sacrifice in order to faithfully discharge those duties devolving upon them as parents, if they can be assured that substantial benefits will be derived.

A child, no matter how young, is as greatly disabled by the loss of a leg as an adult. If one leg is lost, the child becomes dependent on crutches; and if both legs are lost, he becomes the subject of a rolling chair, or has to be carried the same as an infant, or is obliged to hitch himself about on his haunches. Aside from the inconvenience and the humiliation, these methods are unnatural and are sure to leave their unwholesome influences on the limbs, stumps, and joints, as well as on the physique of a developing child. If the child has lost but one leg, and walks for any great length of time on a pair of crutches, his shoulders will, from the weight of his body, become pushed upward, his neck will appear to settle in his chest, his chest will become collapsed, and his spine will fail to acquire the sustaining strength that the habits of manhood will demand.

If the child discards one crutch, as most energetic children do, the effect of being suspended from under one shoulder will be that of canting the body to the opposite side, elevating one shoulder above the other, the development of one side of the body and the arrested development of the other, and the tilting of the pelvis. If the using of one or a pair of crutches is continued through the growing period, the disproportions resulting from unequal development will bring embarrassments that will last through life. The stump, being pendant from the body, performing no functions whatever for a long period, will become poorly adaptable to the uses of an artificial leg. The muscles will become atrophied, the joints powerless, and the range of motions will be lessened. The wearing of an artificial leg under these conditions will be very troublesome, and the task of disciplining the stump will be quite discouraging, and it is doubtful that all the disproportions, enervations, and limitations of motion will ever disappear.

We can cite many cases where the neglect to apply an artificial leg

to a growing child has been the cause of physical weakness that has not been possible to correct. Contracted hips and knees, weakened spines, deflected and rotated stumps, are a few of the many ills that have been traced to this neglect; delays are therefore dangerous.

In double amputations, the failure to apply artificial limbs in youth invites more serious consequences. The stumps become forced into abnormal positions, and subjected to such unnatural influences that the wearing of a pair of artificial legs is greatly encumbered. The art of balancing is forgotten, and has to be acquired again. The hip-joints, having remained in flexed positions the greater part of the developing period, become more or less set, and extension becomes difficult and painful when the erect position is attempted.

An artificial leg applied to a child, no matter how young, supplies a support to the amputated side that is the nearest approach to nature in its effects on the system. While wearing the artificial leg the child has the freedom of his arms, and his joints and muscles are in a state of natural activity, being propped from the knee or pelvis instead of from the shoulders. His spine, his chest, and his shoulders are not under unnatural and distorting influences. They are as free to perform their functions as if the child had never lost a limb. All the parts of the child maintain their relations, and develop naturally and symmetrically.

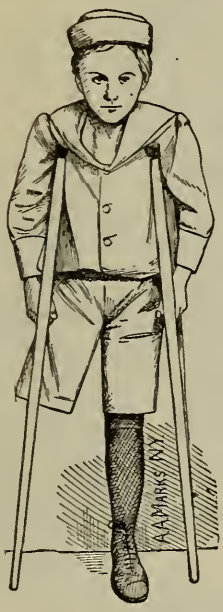
A child always becomes expert in the use of an artificial limb, or in the use of a pair of artificial limbs, and his youthful nature impels him to mingle with other children, engage in the same sports, run, romp, wrestle, frolic, and indulge in all the hilarities of his companions. This variety of exercise makes the child strong, mentally and physically, keeps him healthy, and builds the foundation for that vigorous manhood and active business life that lie before him. Nothing should be permitted to separate him from those wholesome influences. The loss of one or both limbs should be immediately replaced, so that the child will be permitted to do as other children do, and not become dwarfed, ill-shapen, sickly, incapacitated, an object of pity, unequal to the struggles of life, a life-long dependent on others.

A child will undoubtedly outgrow his artificial leg, but this does not entail a serious loss, as it can be altered in length and size to accommodate such growth and development. The expense attending such changes is not great. No greater than the expense of changing or renewing crutches, or repairing rolling chairs.

The only growth of the child that affects the length of the artificial leg is the growth that takes place in the sound leg from the knee to the floor. A child may, in the course of two years, grow four inches in his entire height, but the growth in the sound leg from the knee to the floor will be less than an inch. It is therefore evident that a child growing as much as four inches in eighteen months (which is extraordinary), will not require his artificial leg to be lengthened over one inch in eighteen months (if his leg is amputated below the knee). The frequency with which an artificial leg, worn by a growing child, is lengthened, is about once in eighteen months, and the

expense attending each lengthening is sometimes $3.00, and seldom over $5.00. In families where economy has to be exercised to an extreme degree, the lengthening of the leg can be deferred, by increasing the thickness of the sole and heel on the shoe worn on the artificial foot.

The size of the leg can be increased, and the foot can be expanded, and by these methods the leg can be made to last from five to ten years. It will thus be seen that in extreme cases a child can be supplied with an artificial leg, and the leg be kept in proper length, at an expense less than $5.00 a year; less than ten cents per week, and a little over a cent a day. We can hardly conceive of a parent who is so poor that he cannot meet this expense, or who is so heartless that he would rather see his crippled child hobbling about on crutches during his adolescence merely to save so small an annuity.



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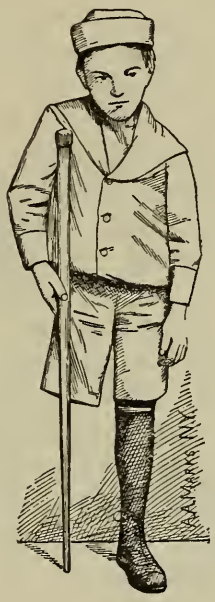

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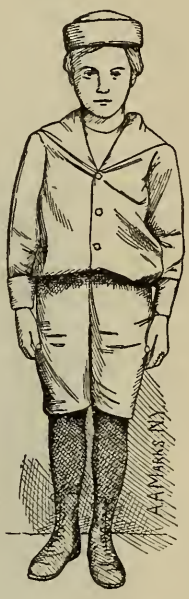


No. 897.

The most important matter to consider is that of duty. All parents are bounden by the laws of nature, as well as by the laws of state, to perform those services that will promote the health and comfort of their offspring, to care for them in sickness, to lessen their afflictions, and alleviate their sufferings. It appears to us that it is a flagrant violation of those laws for a parent to require his child to walk on crutches, subjecting him to the dangers of impaired health and arrested development, when an artificial leg can be so easily obtained and so cheaply maintained—a leg that will perform such important work in ameliorating the child's condition, contributing to his happiness and restoring him to his usefulness. Crutches should be considered temporary supports, to be used only at times of necessity. An artificial leg should be regarded as indispensable, more important than fine clothing, and next

in importance to the food that is required to sustain life. We have no doubt that every mother and every father who carefully considers the facts as above presented, will feel little hesitancy in deciding in favor of the earliest possible application of an artificial leg, or a pair of artificial legs, to their unfortunate children. If their financial resources are limited, they should feel no disgrace in calling upon their friends for assistance, as the urgency is so great as to justify them in resorting to extreme measures, and thus arrest their child from a life of torture and embarrassment, and save themselves the censure and rebuke that neglect of this kind will bring in later years.

Look at the child who is required to go about on a pair of crutches, Cut No. 895. See how his shoulders are pushed out of their natural lines ; notice how his head leans forward, chest sunken, and how frightfully disfigured he appears. Look at the child who hobbles about on one crutch, Cut No. 896. See how one shoulder is raised higher than the other ; notice how his body is thrown to one side, sound leg deflected, neck crooked. Now, look at the child who has been cared for humanely, Cut No. 897 ; who has been furnished with an artificial leg and propped in a natural way on the amputated side. He is the picture of symmetry, his health is robust. No one would suspect that anything unusual had occurred to him, although the child has lost a leg. His artificial leg has become second nature to him; he is forgetful of the fact that he is crippled ; he never realizes his own condition, and never admits that he is disabled. He does everything that his companions do; he is in the ball match with them; he rides the bicycle, skates, dances, and is not denied a single privilege accorded to those in possession of their natural extremities. "To clinch the nail of theory with a few blows from the hammer of experience," we will cite a few cases that have come under our observation.

Cuts Nos. 898 and 899 represent Mabel Thompson. When this child was less than nine months old, it was found necessary to amputate her left leg very close to her knee. After the child had recovered from the operation it was discovered that the tendons of the knee were contracting, and that the stump was being drawn into a flexed position. The mother became alarmed and consulted her physician. It was feared that if the child were permitted to remain without an artificial limb, that she would, in a short time, lose the use of the right knee-joint. The child had not begun to creep, and the thought of applying an artificial leg to one so young could hardly be entertained. It was evident, however, that if an artificial leg was applied, the stump would be forced into such activity that the knee mobility would be preserved. An artificial leg was made and applied. The socket was made to fit the stump snugly, the joints were placed on the sides to harmonize with the natural knee-joint ; a thigh piece encased the child's thigh, and the leg was terminated with a rubber foot. The artificial leg would swing when the child was seated or being carried, and thus force the stump to move at the knee. In a few months the child began to creep. The mother was surprised one morning to find her standing by a chair, putting a share of her weight on the artificial

leg. It was not long before she began to walk, then run and play. The leg was lengthened quite frequently, and enlarged several times. When she was about five years old the leg was renewed. At this writing (1896) she is fourteen years of age, runs or romps about the same as other children, goes to school, and is as happy and jolly as other children. Although her parents are in moderate circumstances, they have never regretted that an artificial leg was applied when the child was young. On the contrary, they realize that by their timely attention to her needs, they have preserved a good stump and retained a valuable knee motion, and they enjoy the consolation of having performed their duty in putting their child in a

No. 898.

No. 899.

condition in which she has grown and developed into a strong, comely, and vigorous young lady, who is to-day the pride of the family.

Cut No. 900 represents another interesting case. Carrie Kuntz, when seven years old, was run over by a carriage and had her left leg so badly mangled that it had to be amputated a short distance below the knee. An artificial leg was applied as soon as the stump had healed. This was done by advice of the family physician, the late Dr. James Knight. The child grew up and developed into a lady of graceful proportions. She is now married, and the fond mother of an interesting family.

Cut No. 901 is an engraving from the photograph of the lady as she appears now.

Thomas Kehr, when eight years of age, was run over by the cars. Both of his legs were crushed. The right was amputated four inches below the body and the left two inches below the knee. As soon as the

child recovered from the amputation and his stumps were healed, Dr. Brady, his physician, advised the application of a pair of artificial

No. 900.

No. 901.

legs. The legs were applied in December, 1875, when he was ten years old. It may be interesting to read Dr. Brady's letter, written on the case in 1876:

BROOKLYN, N. Y., May 16, 1876.

MR. A. A. MARKS:

Dear Sir: I have thoroughly examined the case of the boy, Thomas Kehr, of this city, who has been wearing a pair of your artificial legs for the past six months. About a year and a half ago he was run over by a train of the S. S. R. R. of Long Island, and both of his lower limbs were so crushed that I amputated them, the one well above the knee, the other about one inch and one-half below. At the time of the operation many expressed a wish that death would occur, as the lad being very poor it was thought that his future would not only be a burden to himself, but that his future support, should he reach man's estate, would depend upon the charity of the public, as it was considered about an impossibility for him to serviceably use artificial limbs.

I am thankful that I can say that you have made his future worth the living, by giving him the means of good locomotion.

I saw him two weeks after he had put them on for the first time, and it astonished me greatly to see the remarkable use he had already acquired; since then I have seen him *many* times, and have each time seen marked improvement in the freedom of use in walking.

Within the past week I saw him walking on the street without even the help of a cane, and so little lamed that any person seeing him would not for the

moment have the least suspicion that he was using legs other than such as nature provided.

I feel competent to say that in this case your artificial limbs have proved a grand success. I have never before seen artificial limbs which in action approached so near that of perfection.

I attribute the wonderful success in this boy's case mainly to the superior results achieved by your inventions.

Especially can attention be called to the use of the rubber foot, thereby dispensing with the ankle-joint, thus giving the wearer an *elastic*, *reliable*, and *sure footing*, which must greatly relieve him from the care and *watchfulness* which must certainly be required by those who wear artificial limbs having jointed feet.

Your plain and simple mode of construction of artificial legs is to my mind *unquestionably* the *best*, and when asked by legless persons as to whose make of artificial limbs would prove the best to secure comfort and utility, I most decidedly say, without any hesitation, Marks'.

Very respectfully,

SAMUEL J. BRADY, M. D.

Mr. Kehr is at this writing (1896) a man about thirty years old. He is active, capable, and energetic. He is constantly employed, and has no difficulty in earning his livelihood and laying aside some of his earnings for the "rainy day." His present good health, excellent walking and balancing abilities, strong and powerful stumps, can be ascribed entirely to the fact that artificial legs were applied to him when he was so young. If he had been neglected there is no doubt that Mr. Kehr would to-day be a helpless object of pity. Neither he nor his parents have ever felt the burden of keeping him supplied with artificial limbs of proper proportions, although his parents were in very poor circumstances.

Cut No. 902 represents a girl who had her right leg amputated below the knee in 1884, when she was eleven years old. Cut No. 903 represents her with an artificial leg applied five months after the amputation. She has worn the same limb for six years; had it lengthened several times. She is now a young lady of comely proportions, enjoying vigorous health. In two weeks after the leg was applied she walked a distance of two miles to church; after service she walked the same distance to her home. Her progress was rapid, and in a brief time she indulged in all the pastimes of childhood. She is now wearing her second artificial leg. She and her parents have always felt thankful that by the timely advice of their physician an artificial leg was applied before her stump had an opportunity to become irreparably impaired.

Annie L. Beckwith had her leg amputated above the knee in 1887. She had an artificial leg applied two months after the amputation, when she was seven years of age. The leg has been lengthened three times in five years. She procured a new leg in 1892, not from necessity as much as from the desire to have a new leg. The second leg has been lengthened once. She is now (1896) sixteen years old, and weighs one hundred pounds. When first leg was applied she weighed forty pounds.

Manuel Parraga, San Salvador, Central America, had his leg amputated above the knee in 1876, when eleven years of age. An artificial

leg was applied immediately. His weight at the time was seventy-five pounds. The lad has developed into a man weighing two hundred pounds, thirty-one years of age. He is strong, healthy, and has a model stump, and has ever been grateful that an artificial leg was

No. 902.

No. 903.

applied so soon after the amputation. We append the testimonial which he wrote in 1883:

PEREZ & PARRAGA.
SAN SALVADOR, CENTRAL AMERICA, January 24, 1883.

MR. A. A. MARKS, New York:

Most Esteemed Sir: I have been for a long time desirous of writing you and expressing my continued satisfaction with the artificial leg you made for me, and now avail myself of the opportunity.

It is six years since I obtained an artificial leg from you; during this period I have not had an opportunity to find the least fault with it. I walk very much and without a cane or support. I suffer no pain or uneasiness from it.

Since I have returned to Central America, I find it necessary to make long journeys on horseback. In this, the leg assists me very much. I pride myself on my easy and graceful movements, and the facility with which I mount and dismount.

The india-rubber foot which is on the artificial leg is a most excellent invention; without it, I question my ability to walk with safety in this country, the streets are so very rough and stony.

Your attentive friend,

MANUEL A. PARRAGA.

John Jerome Booth, son of Dr. J. P. Booth of Needles, Cal., had his leg amputated when seven years old, on account of a railroad accident. An artificial leg was applied a year after the accident. Weight of the child, fifty-seven pounds. The leg was worn eight years, and was lengthened five times. In 1891 the leg was renewed, which has since been lengthened twice. The subject is now twenty-one years of age, and weighs one hundred and sixty-five pounds. Under date of November 10, 1887, Dr. Booth wrote a very commendatory letter, in which he states that "My son runs, jumps, climbs, and skates as well as any of his companions, and the closest observers, when informed of his misfortune, are at a loss to determine which is the real and which the artificial leg."

George G. Griswold, left leg amputated below the knee, when twelve

No. 904.

years of age ; artificial leg applied within one year after amputation. We append a letter written by his father:

HARTFORD CO., CONN., March 7, 1896.

A. A. MARKS.

Dear Sir : In reply to your inquiry, about the advisability of applying artificial legs to growing children. I beg to say that I had one of your legs applied to my son George when he was thirteen years old. The leg was made and fitted from measurements without requiring my son to leave his home. From the day he received the leg to the present time, he has worn it constantly, without requiring any repairs or alterations. I hardly know of anything that he could not do that any other boy of his age with two sound legs could do. He could walk, run, or skate, play ball, or climb trees with any boy of his age. When he was sixteen we moved to another town, and for about a year scarcely a single schoolmate or neighbor ever suspected that he ever wore an artificial leg.

I do not believe that it is possible to find another make of artificial leg that is so well adapted to growing children, as yours. I have never regretted having applied an artificial leg to my son George on account of his tender age.

Yours truly,

WARD H. GRISWOLD.

Cut No. 904 represents the boy, Griswold, at the bat. This cut illustrates forcibly the facility with which a child who has lost a leg can be made equal to his companions in the ability to enjoy boy life.

William T. Wilson, when fifteen years of age, was run over by a railroad car and had his leg mangled so greatly that amputation was necessary. A few months after the amputation he had an artificial leg applied. He weighed one hundred and ten pounds, and was at the period of life when growth and development promised to be rapid. The artificial leg was lengthened twice in four years. A new leg was applied in 1885, which he has worn for ten years; present age twenty-nine; weight, one hundred and thirty pounds; occupation, stock raiser. In 1888 the young man wrote the following letter:

ATLANTA, GA., January 5, 1888.

MR. A. A. MARKS.

My Dear Sir: I am so much pleased with my artificial limb that I feel like urging everyone so unfortunate as to lose a leg to try one of yours. It is light and simple, never getting out of fix. During the seven years I have used mine it has never given me the slightest inconvenience, but is always ready for use.

I went to military school one year, and beat the drum, marching in front of the company one hour every day. Coming home, I went into the insurance business, and was an insurance solicitor for over a year, keeping me on the go all day long in rain, snow, and sleet, and I never used a stick. After that I went into the real estate business with my father, and on one occasion walked sixteen and one-half miles on a railroad track in the rain, to transact some business. In this walk I crossed two trestles over fifty feet high, and over a new road that was very muddy. I regard the rubber foot as the greatest invention of this century, it being noiseless and filling the shoe so perfectly. It is almost impossible to say which is the artificial foot. I have gone with new friends for months, and they never once thought I had an artificial limb.

I can dance, act on the bar, skate on rollers, and run.

Yours, etc.,

W. T. WILSON.

James Good, at the age of thirteen, was run over by the cars. Leg amputated below knee. Seven months after amputation an artificial leg was applied; age fourteen; weight, eighty pounds. Leg was lengthened every eighteen months until 1875, when it was renewed. The boy grew to be a man of large and heavy proportions, and at this writing (1896) is a locomotive engineer. In 1887 he wrote the following testimonial:

JERSEY CITY, N. J., November 1, 1887.

MR. A. A. MARKS.

Dear Sir: I have worn your artificial leg for the past sixteen years and have found it entirely satisfactory.

I have been employed as locomotive fireman, and at present am locomotive engineer, and have never found any difficulty in performing my duties.

Yours respectfully,

JAMES GOOD.

George W. Sheridan, son of General George A. Sheridan, at the age of ten was thrown from a carriage by a runaway horse; one leg was crushed and had to be amputated below the knee. Nine months later his solicitous mother insisted on an artificial leg being obtained, in opposition, however, to the advice of others. The following letter, writ-

ten by his father in 1885, tells the story of how completely an artificial leg restored the boy. Sheridan is now twenty-six years of age, is a well developed man of large proportions, and always refers to the early application of an artificial leg to his stump with much gratitude.

NEW YORK CITY, July 1, 1885.

MY DEAR DOCTOR: The last leg you made for my son came promptly, and is satisfactory. The boy is now fifteen years old; he has worn a leg of your make for the past five years, and *always with comfort and satisfaction.* When visiting him at his school a while since, I found he was out for a day's fishing; when he returned and stated where he had been, the teacher remarked he had walked at least twelve miles. George skates on steel or roller skates, rides a bicycle, and, in short, enjoys to the full the usual sports of boys of his own age. For this we have you to thank more than anyone in the world.

Yours truly,

GEORGE A. SHERIDAN.

To DR. A. A. MARKS, Broadway, New York.

Hattie Moore, at the age of thirteen, had her foot amputated at the ankle. In six months after the operation an artificial foot was applied. She wore the leg five years without lengthening. The growth of the natural foot from the ankle down was not great enough to require any alterations in the artificial foot. In 1887 she was nineteen years old and procured a new foot. We append her testimonial.

CHENANGO COUNTY, N. Y., November 9, 1887.

MR. A. A. MARKS.

Dear Sir: My foot was amputated when but a child of thirteen, and as soon as it was sufficiently healed, I had one of your admirable rubber feet applied, made and fitted from measurements. It fitted me as perfectly as though I had gone to New York and had the foot fitted by your own hand. I have used the foot four years now, to the untold satisfaction of myself and the utmost gratification of my friends, who often tell me they would never notice anything peculiar about my walk. I have lived with people for months without their discovering that I was lame.

During the greater part of the time since I have worn your artificial foot, I have attended a boarding school, with its usual number of stairs, which I have run up and down with the greatest ease. I am at present doing a daughter's part of the housework, standing upon my feet the larger portion of the time.

Very gratefully yours,

HATTIE L. MOORE.

William E. Shaw, leg amputated above the knee, for dislocation of knee. Artificial leg applied June, 1892. Age nine years. Leg has been lengthened twice since then.

WEBER COUNTY, UTAH, March 11, 1896.

MR. A. A. MARKS.

Dear Sir: I received your letter. You wanted to know what success my boy has had with his leg. He has had good success with it; he can walk and get around very well. He would not be without it for anything. I think the best thing that can be done for a child when he has lost one of his limbs, is to get an artificial leg without delay.

Respectfully yours,

ELIJAH SHAW, JR.

John Kershaw, leg amputated above the knee, November, 1890. Railroad accident. Artificial leg applied April, 1891, at the age of nine years. Leg lengthened March 6, 1895.

FALL RIVER, MASS., March 22, 1896.

A. A. MARKS.

Dear Sir: In reply to yours of the 7th would say: I passed John Kershaw on the streets three months ago. From the success attained in his case I shall certainly advise the application of an artificial leg to a growing lad as soon as his stump is properly healed.

John Kershaw has been able, thanks to his artificial leg, to enjoy his early life equally with others not so unfortunate.

He plays football, baseball, and all other sports. I think he would have lost all power of his stump if the leg had not been employed, as the stump is but about six inches long, and would in all probability have become strongly flexed if he had grown older without a leg to keep the joints in condition.

Yours very truly,

A. C. DEDRICK, M. D.

Flossie Lee, leg amputated below the knee for injury, in February, 1891. Artificial leg applied the following August, when the child was four years old.

CHEPACHET, R. I., March 15, 1896.

MR. A. A. MARKS.

Dear Sir: Yours of the 29th ult. received. In reply allow me to say that Flossie Lee has worn the artificial leg which you fitted for her five years ago, continuously since that time, excepting when sent to you for lengthening. It is needless to say that her development in both mind and body is very different from what it would have been had she been confined to the house all these years. She has been to school and runs about like other children, which means everything to a growing child. No change has been made in the leg all these years besides the increase in length.

Very truly,

G. A. HARRIS, M. D.

Thomas McAleer, leg amputated above knee on account of accident in October, 1889. Artificial leg applied at the age of seven years by the recommendation of Dr. D. K. Dickinson.

CHIEF SURGEON'S OFFICE,
LEAD, S. D., March 6, 1896.

A. A. MARKS.

Dear Sir: In reply to yours with reference to the seven-year old boy (McAleer), whom you so nicely fitted with an artificial limb, for amputation above knee-joint, I will say that it has given perfect satisfaction. I should recommend the application of a limb by all means in similar cases.

Respectfully,

D. K. DICKINSON, M. D.

Ettie Stangl, leg amputated below the knee November, 1889. Artificial leg applied December, 1890. Age eight years.

RICHARDSON COUNTY, NEB., March 3, 1896.

A. A. MARKS.

Dear Sir: Your letter of February 28 was received. In regard to the success with that artificial leg, I can say that the leg fits well and Ettie Stangl is well pleased with it. She used it a little the evening she received it, and the next morning walked three-quarters of a mile to school, and she did not look like a cripple. She has moved from here. Speaking for the time she lived here,

I can say that the artificial leg was a great relief to her; and I think providing her with the limb when she was so young was the best thing to do for her health and comfort.

Yours truly,

DAVID JONES.

Mary Wiley, both feet amputated December, 1891. Cause, railroad. Artificial feet applied April, 1892. Age eight years. This little girl attends school, and is a forcible example of the wisdom of applying artificial limbs to children, especially when both legs are amputated.

Clarence Wintersgill, both legs amputated. Right, six inches below, and left, three inches above the knee. Cause, railroad. Artificial legs applied September, 1893. Age seven years.

BEAVER COUNTY, PA., March 1, 1896.

MR. MARKS.

Dear Sir: In answer to yours of February 27, would say that in my son's case the application of a pair of artificial legs has been a wonderful success. Clarence was but seven years old when you made him his limbs, and it is wonderful how he has learned to use them. He skates, rides his horse, goes to school, and can walk several miles without resting. I was advised not to get Clarence any limbs till he had ceased growing, and had almost made up my mind to wait, but to look at my child sitting out in the yard in the dirt, and to think that he must do so until he had finished growing, made me almost frantic. In the meantime I received one of your books, and I studied it day and night, till I came to the conclusion to try a pair of your limbs, with the results mentioned above.

You will remember Clarence's left leg is off above the knee, and the right below the knee. He was wearing his artificial limbs one year after amputation, and if I had to do it over he would wear them in six months.

Yours with respect,

R. F. WINTERSGILL.

John E. Palmer, leg amputated below the knee, September, 1891. Artificial leg applied February 19, 1892. Age nine years. January, 1894, leg was lengthened. This boy goes to school and occupies himself the same as other boys do.

QUEENS COUNTY, N. B., CANADA, March 7, 1896.

A. A. MARKS.

Dear Sir: Reply to your request, to know what success my boy has had in using his artificial leg, he being only nine years old when he commenced wearing it; he is now thirteen. I can say that it has afforded him the greatest service and satisfaction, and he could in no way be induced to do without it; he is growing fast and has the best of health.

Yours very truly,

BRADFORD PALMER.

Anton Gaub, leg amputated in 1884. Artificial leg applied a few months after the amputation. Cause, run over by a wagon. Age four years. Gaub is now seventeen years old, is full grown and well developed. He has always used a leg, and never cared to use crutches; he is in good health and very strong, can walk great distances, frequently plays baseball, football, and other games. Can skate and dance. His parents are in moderate circumstances, his father being a wage-earner.

They have never regretted providing their son with an artificial leg. Anton Gaub has for some time been employed in a piano factory, tuning pianos. He earns supporting wages.

Roscoe E. Bosworth, leg amputated below the knee April, 1890. Cause, railroad. Artificial leg applied February, 1891. Age nine years; leg was lengthened in March, 1893, and the same leg is still in use.

WORCESTER COUNTY, MASS., March 3, 1896.

A. A. MARKS.

Dear Sir: Yours of the 28th received, and in reply will say I think it was a very wise proceeding putting an artificial leg on my son Roscoe, as he now has full use of his knee-joint, which I think would not have been the case without the artificial limb, and I think he is straighter and in better health. It always made him sick with stomach trouble whenever he used crutches.

Roscoe can skate, ride a bicycle, or do almost anything that other boys do, and if I had another child that had the misfortune to lose a foot at two years of age, I should have an artificial limb applied as soon as possible.

Respectfully yours,

LEVI BOSWORTH.

Roy Y. Bryant, leg amputated above the knee in 1890. Cause, run over. Artificial leg applied immediately. Age seven.

PROVIDENCE, R. I., March 6, 1896.

A. A. MARKS.

Dear Sir: In reply to yours of February 28, in regard to my son's artificial leg, will say my son has worn his artificial leg constantly, with the exception of times when it has been at your factory to be lengthened, for over five years. He is now twelve years old, and is growing up straight and strong. Of course, his height is constantly changing and watch has to be kept so that the leg will be kept the proper length.

You ask whether in my opinion the application of an artificial leg to the child before he had become fully grown is a wise proceeding. I will say that in this case it was entirely so, as thus far Roy has shown that he has been greatly benefited by the artificial leg.

Yours very truly,

E. B. BRYANT.

Willie Bowie, Brooklyn, N. Y. Leg amputated above the knee in March, 1892. Cause, railroad. Artificial leg applied August, 1892. Age ten years.

BROOKLYN, N. Y., March 7, 1896.

DEAR SIR: I was hurt when I was ten years old. My father's aim was to get an artificial leg for me as soon as possible and he has never regretted it.

It would be hard for anyone to know that I wear an artificial leg, as I ride a bicycle (one day I rode forty-four miles), have learned how to dance fairly well, and play all sorts of boys' out-door games.

I have used one of your artificial legs over three years, and it is gratifying to know that one side of my body develops as well as the other.

Very respectfully,

WILLIE E. BOWIE.

Carl T. W. Banks, leg amputated above the knee in March, 1894. Cause, railroad. Artificial leg applied September, 1894. Age five years. Leg has been lengthened but once.

CAMBRIDGE, MASS., March, 1896.

MR. MARKS.

Dear Sir: The question of applying an artificial leg to a young child was one of great thought to me, as many of my friends thought it unwise to do so. My son, Carl, who was seven years old the 14th of February, 1896, has been wearing the leg made by you since September 24, 1894, applying it six months after amputation. He plays out doors in all kinds of weather, is in perfect health, and is growing finely; we have reason to think that the leg has been a great benefit to him. It is so much easier to use, and looks so much better than crutches.

Yours sincerely,

ELLEN L. BANKS.

Emma Zern, leg amputated above the knee May, 1891. Caused by a stone falling on her leg, crushing it. Artificial leg applied October, 1892. Age nine years.

ANNVILLE, PA., March 18, 1896.

MR. A. A. MARKS.

Dear Sir: Yours is at hand, asking my opinion in regard to Emma Zern. Her leg had been amputated in lower third of thigh in 1890, when nine years old. She received an artificial leg which she has used without interruption. In the spring of 1895 she had grown 2½ inches; the leg was then lengthened at a small cost, and she has been using it since.

At first I was doubtful that a child of her age should have an artificial limb, but am now convinced that a child cannot be too young, as this case will show.

Respectfully,

J. WILLIAM TRABERT, M. D.

Nellie Cartwright, at the age of eleven, met with an injury in her leg that necessitated an amputation below the knee. Sixteen months

No. 905.

after amputation an artificial leg was applied. The leg has been lengthened twice in three years. A testimonial written in 1896 by her father is herewith appended. Cut No. 905.

PUTNAM COUNTY, O., March 7, 1896.

DEAR SIR: In reply to yours asking my opinion as to the advisability of applying artificial limbs to growing children, I would say that I purchased from you a leg for my daughter, Nellie Cartwright, in 1893, she being at that time between eleven and twelve years old. She lost her foot some months prior to that time, and, as she has used the leg nearly three years, I believe I

am able to judge of the results, and will say that I would recommend the use of artificial limbs for children of any age, and that the sooner a child has a leg applied after losing a natural one, the better it will be for that child. My daughter is now fourteen years old, attends school, goes shopping, and enjoys out-door exercise as other children do, and one can scarcely tell that she has suffered the loss of a foot. I would say in conclusion that in my opinion there are two reasons that ought to induce every parent to obtain an artificial limb for their amputated child. First: It enables a child to walk naturally, and thereby promotes good health and spirits, symmetrical growth and maturity. Second: A child becomes accustomed to the use of the limb while young and active, and will ever afterward use the leg with better results than it could if the use was delayed until maturity.

Respectfully yours,

J. S. CARTWRIGHT, C. E.

Clara Giere, leg amputated below knee October, 1888. Cause, injury from the gearing of a windmill. Artificial leg applied February, 1894. Age eight years.

HAYFIELD, MINN., March 18, 1896.

A. A. MARKS.

Dear Sir: Yours of the 29th ult. has been received. The artificial leg which I ordered for Clara Giere two years ago, has given good satisfaction. The patient has grown some since then, but her father has added to the leg from time to time, and she is still using it with much comfort and usefulness.

Yours respectfully,

E. OLONZO GIERE, M. D.

Alvin R. Eaton, Jr., leg amputated above the knee March, 1891. Artificial leg applied May, 1891. Age thirteen. Cause, run over by railroad cars. This lad has grown very rapidly, and has had his artificial leg lengthened three times.

ELIZABETH, N. J., March 9, 1896.

A. A. MARKS.

Dear Sir: In reply to your letter of inquiry as to the results of the application of an artificial limb in the case of our son, who was subjected to a knee amputation when he was thirteen years old, and had limb applied in less than three months after the operation. Our son learned to use the artificial limb so readily that he never fully realized the loss of the natural member; his growth was in no way retarded, and it is marvelous to know to what athletic feats he is equal. He rides a bicycle, plays tennis and basket ball, performing remarkably well on the horizontal bars, has tramped long "carries" in the Adirondacks, and shot a deer there the year after his great loss, which you so successfully repaired. We are pleased to pay this simple tribute to your skill but words fail to express our appreciation of the blessing which "The Marks' Artificial Limb" has been for our son. Believe me,

Most faithfully yours,

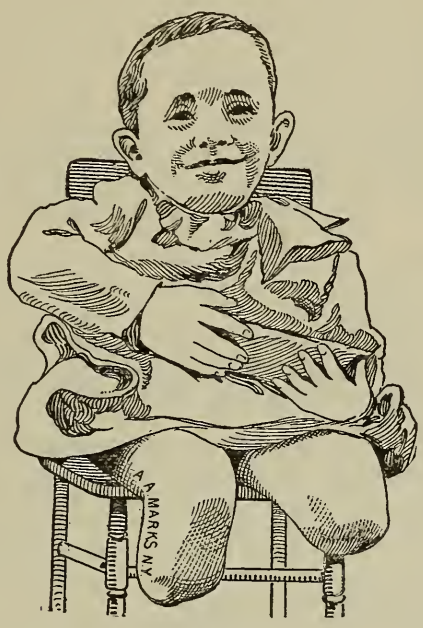
ALVIN R. EATON, D. D. S.

Ambrose Mullin, Syracuse, N. Y., both legs amputated below the knees April, 1893. Cause, trolley cars. Artificial legs applied March, 1895. Age four years. Weight, thirty-two pounds. Dr. Gregory Doyle, who amputated Mullin's legs, took more than ordinary interest in this remarkable case, as his contribution to the *Buffalo Medical and Surgical Journal* of September, 1893, shows:

DOUBLE SYNCHRONOUS AMPUTATION OF BOTH LEGS IN AN INFANT.—RECOVERY.

BY GREGORY DOYLE, M. D., SYRACUSE, N. Y.

On the 8th day of April last, Ambrose Mullin, the infant son of Michael Mullin, of 1015 Willis Avenue, Syracuse, N. Y., was run over by an electric car, and suffered what was thought at the time fatal injuries. Both legs were crushed off just below the knees, and his



No. 906.

head was so severely injured as to produce cerebral concussion, large, dark tumors being produced on the forehead and occiput. He suffered also severe contusions over the sternum. About an hour after the accident I reached the little patient, and found him in a complete stupor, and very anæmic from the immense loss of blood. By hypodermic stimulation he rallied sufficiently to warrant me in removing the mangled members. The amputations were made carefully, but rapidly, as I knew celerity to be a strong element in possible success. During the operation hypodermic stimulation was persistently kept up, and we had the pleasure of seeing our almost hopeless patient slowly but steadily rally from the shock. He made a good recovery, without any noteworthy incident. The stumps healed rapidly, with good, cushioned ends, so that, hereafter, artificial limbs can be worn with comfort, and the child may grow up to be a useful and honorable citizen. At present he is able to go about the house and yard on his knees, and is healthy and cheerful, as the above photograph indicates.

The child was born January 10, 1891; both legs were amputated April, 8, 1893; his age at the time of the operation was, therefore, a little over two years. As far as I can learn, this is the youngest child on record that has recovered from a synchronous amputation of both legs.

I was ably assisted in this unusual operation by Drs. J. W. Knapp, N. L. Mulvey, and Gregory Reidy.

SYRACUSE, N. Y., March 1, 1896.

A. A. MARKS, Esq.

Dear Sir: On the 8th day of April, 1893, Ambrose Mullin was run over by a trolley car and both legs were crushed in such a manner that I found it necessary to amputate them just below the knees. He made a rapid recovery, with well-cushioned stumps. His extreme youth precluded, for a time, even the thought of artificial limbs. The little lad was remarkably active and vigorous, and would run about the house and yard on his knees, which frequently became inflamed from over-use. I feared, as a result, permanent ancylosis of the knee-joints at right angles. I finally asked your firm if the child could be fitted with artificial limbs that would be practicable. Your response was encouraging, and I told the father to order them. In due time the limbs were properly fitted, and the result has been most satisfactory.

The child wears the limbs every day since he first put them on, and will not do without them, as he seems to take a great pride in them. He runs about, playing with other children, and few would notice anything unusual in his locomotion.

I am now more strongly than ever impressed with the propriety, and even the urgency, of adapting artificial limbs to young children that have suffered the loss of one or both legs.

Ambrose Mullin was but a few days over two years old when his legs were amputated. When four years of age he began wearing artificial limbs, and has worn them ever since, with complete success and absolute comfort. Had he not been protected by artificial limbs, he would have suffered irreparable injury to his knee-joints. Where crutches are used at his tender age, the vessels and nerves of the axillæ are so compressed as to interfere with the nutrition and proper development of the arms.

Since the child began wearing the limbs, his former irritability and sensitiveness have left him, and he is now as cheerful as the children he plays with.

For children that have lost but one leg I would also unhesitatingly recommend the wearing of an artificial limb, as the development of the child's body thereby becomes more symmetrical.

Sincerely yours,

GREGORY DOYLE, M. D.

Erla Jones was run over by a trolley car when twenty-two months old. Right leg amputated above the knee July 28, 1894. Artificial leg applied the following October; weight of the child, twenty-four pounds. Leg was lengthened 1½ inch eleven months after being applied.

FAYETTE COUNTY, PA., March 4, 1896.

A. A. MARKS.

Dear Sir: Your letter of the 27th ult., with reference to success we have had by applying artificial limb on a child so young. I cannot express the gratification we feel in having gotten Erla the limb at the earliest possible moment after stump was healed. Her leg was amputated on the 31st day of August, 1894, and in the latter part of October, same year, she was walking alone, with one of your artificial limbs. She has worn it constantly ever since, excepting two weeks, when you lengthened it two inches, as she grew so fast it became too short for her. She goes up and down stairs alone, and

when playing with children you would scarcely know the difference; the stump is developing nicely. There can be no question in our case as to the wisdom of getting her limb as soon as we did. It has proved a blessing to her and to ourselves.

Respectfully yours,

J. W. JONES.

Antone Pojar, August 11, 1893, had his right leg amputated below the knee, on account of injury received from a sickle. On the following November an artificial leg was applied. The child was four and one-half years old, and weighed forty pounds. Leg was lengthened 1⅛ inch in September 11, 1895. Of this case Dr. Atkinson writes as follows :

DODGE, NEB., March 2, 1896.

A. A. MARKS.

Dear Sir : The artificial limb procured from you in 1893 for Antone Pojar, four and one-half years old, has given entire satisfaction. I believe it good practice to apply an artificial leg to a growing child, as it allows of a more symmetrical development.

Respectfully yours,

IRA E. ATKINSON, M. D.

Bertha Reed, Frontier County, Neb. Right leg amputated below the knee August 5, 1887. Artificial leg applied October, 1890, when eight years old. Weight forty-five pounds. Has worn the leg five years, with only one lengthening, except such as were made at home.

Abe Reyman, Brooklyn, N. Y. Both legs amputated above the knees March, 1894. Run over by trolley cars. Artificial legs applied August, 1895, at the age of nine years. This lad walks very well, considering the gravity of his case. The artificial legs are keeping his hip joints in good condition. See illustration and description of this case on p. 119.

Charlie Moore, at the age of eight, had his leg crushed by a wagon; amputated in 1887 above the knee. Had an artificial leg applied within a few months after amputation. The leg was lengthened four times in eight years. He is now eighteen years old, good proportions, strong, and healthy.

SUFFERN, N. Y., March 4, 1896.

A. A. MARKS.

Dear Sir : In November, 1885, my little son Charles Moore, then eight years old, met with an accident which resulted in the amputation of his right leg. He went on crutches two years, but was pale and sickly and grew but little. The doctor saying he was afraid constant use of crutches would induce spinal disease or lung trouble, I resolved to buy an artificial leg for him. I did so, and was delighted with the result. The boy could run, jump, and play like other boys from the start. He has grown stout and strong, no one knowing that he is wearing an artificial limb unless they are told. I would advise all parents who have children as unfortunate as mine, to buy one of your artificial legs without delay, as it certainly is the best means of preserving the health and encouraging the growth of the child. Besides the child readily adapts itself to the use of one, and learns to handle it much quicker and more naturally than a grown person. I advise buying one of the limbs manufactured by you, because an artificial leg worn by a child, particularly a boy, gets very rough usage, as I can testify, and those manufactured by you are admirably adapted to children's use. They are strong, and at the same time so light

in weight. My son wore his for eight years, with only a slight expense occasionally for lengthening as he grew taller. I was so well pleased with it that a year ago, when buying a new one, I ordered from you.

Very respectfully,

MRS. JAMES L. MOORE.

SCOTTSBURG, N. Y., March 3, 1896.

MR. A. A. MARKS.

Dear Sir: In answer to yours of late date, I would say that I am entirely satisfied with the leg you made for me. I lost my leg when I was about eight years old, and have worn one of your legs for about nine years. At first it was quite difficult to handle, as I only had a few inches of my own leg left, and so could not control it as well as if I had more stump. I was very small when I lost my leg, and my folks all thought that if I wore a wooden leg it would interfere with my growth, but I think that the leg has helped nature in that task. It fills the bill.

Yours very truly,

CHARLES C. MOORE.

THE AGED.

When a person has passed the allowed span of life, and in his declining years meets with the loss of a leg or an arm and he recovers from the operation and shock, the thought of wearing an artificial limb is attended with some doubts as to the results attending the venture. Will not the infirmities of age come fast and heavy and prevent him from using an artificial limb at all? Is the prospect of living a few years promising enough to justify the purchase? These are questions that are deeply considered by persons in moderate circumstances.

Our experience and research in this line have brought to light a few facts that we feel impelled to present to those who are interested in this subject. The fact is established beyond dispute that a person of any age, no matter how old, who recovers from the shock of having an injured or diseased member removed, is destined to live for a number of years, and to enjoy good health and renewed vigor. Records show that the maimed do not die prematurely, that the removal of a leg or an arm has a tendency to lengthen life, adding tone, health, and vigor to the system, like cutting a limb from an old tree; the demands on the vital forces are lessened, and the remaining parts become more abundantly nourished.

No person can be too old to have an artificial leg applied. Old age does not justify the use of crutches or the rolling-chair beyond the recuperating period. If an artificial leg will take the place of crutches and the invalid chair, the leg should be obtained and applied and the crutches discarded. The few years that are left should be made as full of comfort and cheer as possible.

To strengthen our advocacy of the application of artificial legs to the aged, we will cite a few of the many cases in which artificial legs have been applied, and resulted in being helpful, comforting, and profitable to the purchaser.

Rev. Edward Beecher of Brooklyn, N. Y., brother to the distin-

guished divine, Henry Ward Beecher, had his leg crushed by railroad cars in 1889, when he was eighty-four years old. Nobody supposed that this aged man would recover from the accident or leave the hospital alive, but by skillful surgery and careful nursing, Mr. Beecher in a brief time recovered from the operation and was able to take short walks by the use of crutches and the aid of some of the faithful members of his family. The writer well remembers when he was summoned to this clergyman's house. There sat the reverend gentleman, his long white hair hanging in wavelets over his broad shoulders. He looked weak and tired. He had just returned from a short walk on his crutches, and was nearly exhausted. He greeted me with a strong voice, somewhat in the following language: "I am a very old man, and I don't think I have long to live. It seems foolish for me to think of getting an artificial leg, but Mr. Sage of my congregation has been very insistent that I should try to walk again, so I have sent for you and wish to have you make a leg for me. Mr. Sage told me to get the leg, and he would pay the bill. So go ahead and do all you can for me, and I will do my best to use the leg."

The leg was made and applied, and in less than six months after Mr. Beecher met with the accident he was walking on an artificial leg. He operated cautiously and systematically, and in an incredibly short time he became accustomed to the artificial leg, and was able to take long walks and to attend to his church and parish work. He found the leg easier to operate than the crutches, and much safer, he wore the leg for eight years, and frequently walked several miles in a day, making a practice of walking a mile every morning. He died at the age of ninety-two.

Let us assume that Mr. Beecher, on account of his advanced age, had never applied an artificial leg. Would it be reasonable to suppose that he would have lived as long and enjoyed as good health with the little exercise the use of crutches would have permitted? The artificial leg enabled him to take long walks and more vigorous exercise, and be out in the health-giving atmosphere a greater part of the time, and in this way contributed to his health and longevity. The denial of an artificial leg would certainly have been a severe punishment to this good man for the misfortune of having become crippled in old age.

Charles Van Brunt, Long Branch, N. J., had his foot amputated on account of senile gangrene, when he was seventy years old. An artificial leg was applied within six months after the amputation. He used that artificial leg for fifteen years; he died at the age of eighty-six. During most of the time he performed the duties of janitor in a large school.

George Hinman, New Haven, Conn., had his leg amputated on account of senile gangrene, when he was eighty years old. He had worn the leg for four years, when he died at the age of eighty-four.

Mrs. Susanna Brown had her leg amputated above the knee at the age of seventy-three. An artificial leg was applied four months after amputation. She had worn the leg for three years, when she died of

pneumonia. Dr. A. L. Brittin, of Athens, Ill., under date of February 10, 1896, wrote of the case as follows: "Mrs. Susanna Brown of Cantrall, Ill., for whom you manufactured an artificial leg in 1892, died of pneumonia May 1, 1895. The artificial leg was eminently satisfactory to her in every way, she being able, when in health, to walk about with only the aid of a cane. She was in no sense a helpless cripple. She could and did ascend and descend stairs without assistance and without fear of falling. Any further information in reference to this interesting case, I will be pleased to furnish you."

David Penfield, leg amputated below the knee on account of gangrene, when seventy-two years of age. Dr. White's letter appended contains a history of the case.

FRANKLIN, N. Y., February 6, 1896.

A. A. MARKS.

Dear Sir: I will gladly give you the facts in regard to David Penfield's case. He was in the seventies when I first saw him, and had had two attacks of cerebral apoplexy, which had left one arm and one leg paralyzed to such an extent as to make walking and use of the arm impossible. In 1891 I amputated the foot of the affected leg for gangrene. He recovered, and in 1892 I got an artificial leg from you for him. He learned to use the leg very soon for a man of his age and condition, and was able to walk about fully as well as before he had gangrene. He lived about a year in comfort and enjoyment, when he died. The artificial leg in his case was a pronounced success.

Yours truly,

S. J. WHITE, JR., M. D.

Nelson Stevenson, Salem, Ind., leg amputated above the knee at the age of sixty-seven; an artificial leg was applied a few months later, which was worn for three years, when he died from other causes.

Frederick Triebold, St. Paul, Minn., leg amputated above knee at the age of seventy-four. Artificial leg applied about eight months after amputation. Age, at the present time (1896), seventy-six years.

COTTAGE GROVE, MINN., February 8, 1896.

A. A. MARKS.

Dear Sir: I am pleased to say that Frederick Triebold considers the artificial leg you made for him indispensable. His health is remarkably good, and he wears the leg all the time.

Yours truly,

A. H. STEEN, M. D.

Russell Perkins, leg amputated in 1894 on account of being shot. Age sixty-nine. Artificial leg applied eight months after amputation.

EDMESTON, N. Y., February 6, 1896.

A. A. MARKS.

Dear Sir: Mr. Perkins gets along very well with his artificial leg. He does his chores about the farm and frequently comes to town. I saw him at a neighbor's funeral. He was not using a cane and was getting along very well.

Respectfully yours,

WILLIAM R. LOUGH, M. D.

James R. Bugbee, leg amputated in October, 1892, from injuries received by a fall. Artificial leg applied the following July, at the age of seventy-six.

NORTH ATTLEBORO, MASS., February 8, 1896.

MR. A. A. MARKS.

Dear Sir: I have used the leg you made for me, two and a half years. It has proved generally satisfactory. I am now seventy-nine years old. I am able to do my work around the house and garden, which I could not possibly do with crutches.

Yours truly,

JAMES R. BUGBEE.

William P. Hiller, Nantucket, Mass., now seventy-four years old, in excellent health, a man actively engaged in manual work. He has worn an artificial leg for thigh amputation for thirty-one years.

NANTUCKET, MASS., February 11, 1896.

A. A. MARKS.

Dear Sir: I wish to state that I am seventy-four years of age, and have worn an artificial leg since 1865. Your artificial legs have proved very satisfactory. My stump is very short above the knee.

Yours respectfully,

WILLIAM P. HILLER.

Bradford Beal, injured by mowing machine. Leg amputated in 1894 at the age of eighty-three. Leg applied the following February. Read his letter.

HILLSBORO COUNTY, N. H., January, 1896.

A. A. MARKS.

Dear Sir: The leg you made for me and sent to me a year ago I am wearing constantly. I can go about the house without any crutch or cane. I have gone a mile and back a number of times. I am eighty-four years old. I am much pleased with your artificial limb.

Yours truly,

BRADFORD BEAL.

Bartholomew Marks, leg amputated in 1887 on account of railroad accident. Artificial leg applied a short time after amputation. He still wears the leg, and at this writing (1896) is eighty-one years old.

PORTLAND, ME., February 11, 1896.

A. A. MARKS.

Dear Sir: Referring to the artificial leg I got from you some time ago, I beg to say that the leg is satisfactory, and is a great help to me.

Respectfully yours,

B. MARKS.

Melinda Gillen, Dover, N. J., leg amputated below the knee, March, 1885, on account of fracture from fall. Artificial leg applied May, 1886, at the age of seventy-two; she is now (1896) eighty-three years old and wears her leg constantly.

DEAR SIR: I take this opportunity of writing to you. I am getting along very well for one of my years. All that worries me is that I am afraid that I shall live so long that I will have to get another one. I am doing all I can to recommend your limbs.

Yours truly,

MRS. MELINDA GILLEN.

James Elliott, Sailors' Snug Harbor, Staten Island, N. Y., leg amputated in 1862; has worn artificial legs for thirty-four years; is now (1896) eighty-one years old. His health is excellent; he walks a great deal and busies himself at times making baskets.

Rev. Silas M. Rogers, now (1896) seventy-three years old, has worn an artificial leg for many years.

ELLENBURG, N. Y., November 21, 1895.

A. A. MARKS.

Dear Sir: I cannot see how the foot that I have been using now for the third year can be in any way improved. It gives me entire satisfaction. I wish you the greatest success and prosperity.

Yours truly,

REV. SILAS M. ROGERS, A. M.

Henry Allendorf, Cincinnati, O., leg amputated below the knee, March, 1892, on account of falling from the roof of a house. Artificial leg applied October, 1892, at the age of seventy-six; now (1896) he is eighty years old and wears the leg constantly. We have received the following letter regarding this case:

CINCINNATI, O., February 27, 1896.

A. A. MARKS.

Dear Sir: I saw Mr. Allendorf to-day. The old gentlemen is doing first class. No complaints whatever, and he wishes me to state this fact to you. A strange person never notices that he is wearing an artificial limb.

Very respectfully yours,

WILLIAM AUTENREITH.

Mrs. Reuben Ramsdell, leg amputated December, 1891, below the knee, on account of necrosis of bone. Artificial leg applied January, 1894, at the age of seventy-three. The following letter applies to her case:

NEW IPSWICH, N. H., March 2, 1896.

A. A. MARKS.

Dear Sir: Your letter received. In reply I would state in reference to the case of Mrs. Reuben Ramsdell, of East Ridge, N. H., a patient of mine whose left leg was amputated in the upper third, on December 3, 1891.

Mrs. Ramsdell's age at the time of the amputation was seventy-one. In December, 1893, I fitted a leg to her of your manufacture. Her stump flexed to nearly a right angle, due to contraction of the tendons and muscles, but you adapted the leg to this condition admirably.

Mrs. Ramsdell used the leg with much advantage, and it was a source of much pleasure to her until the time of her death, October 25, 1895, at the age of seventy-five years, five months, and four days.

The artificial leg caused her no inconvenience, and afforded her much gratification, enabling her to lay aside her crutches and use a cane. The immediate cause of her death was acute bronchitis.

Yours truly.

F. W. JONES, M. D.

PART II.

ARTIFICIAL ARMS AND HANDS.

ARTIFICIAL ARMS.

Artificial arms that have passed into history are referred to on the first pages of this book. The historic arm made for the German knight, Goetz von Berlichingen in the sixteenth century, and the arm suggested by the celebrated surgeon Ambrose Paré, as well as the productions of Le Petit Lorrain, Father Sebastian, Bailliff, Verduin, Serré, Wilson, and De Graef, are described as fully as knowledge will justify under the caption "A Bit of History." Unfortunately the records of the earlier protheticians are so meager that we are unable to ascertain the methods for construction that they employed, and some very obscure inferences as to the results attained. We are convinced, however, that artificial arms and hands constructed in early times were more specific than general in their utility, like the one made for the warrior M. Sergius (167 B. C.), which was only capable of holding a shield to defend his body while in battle. The arm made for a celebrated tenor in the sixteenth century was calculated to aid him in his histrionic effects, and utterly useless beyond that purpose.

We are convinced that this art is better understood now than at any previous time; that the arm of the present day is superior in every way to the one of the sixteenth century; that the present range of usefulness is greater, ornamentation more perfect, and the substitution of the natural arm carried to a more satisfactory stage.

The demand for artificial arms has never been as great as it is now. The incentive to invent and improve is responsive to necessity, want begets supply, and competition is the thoroughfare for improvement. The need for prothesis is increasing in direct proportion to the utilization of agricultural, mining, factory, transportation, and all other machinery calculated for the rapid achievement of results. As the mileage of railroads becomes greater, the mutilation of the human body becomes more frequent; the mowing machine and the reaper have cut off more legs and arms than the scythe or cradle; dynamite used in the arts has mutilated the human body and destroyed life and limb in far greater numbers than the common black powder of former days; the agencies that advance civilization seem to have a baneful effect on life and limb. While those agencies are active in doing their work of mutilation, prothetic genius is stirred to action. Protheticians have improved upon the devices of early masters, and have brought the adaptation of artificial arms to more practical and general uses. We venture the assertion that as much thought, compared to the relative importance, has been given to this subject as to any of the arts and sciences, the sewing machine, the steam engine, and electricity not excepted.

At the beginning of the present year the patent office reported that

thirty-five separate patents had been granted for the protection of improvements in artificial arms. This represents but a very small proportion of the actual number of devices that have been made to replace the lost members; thousands of artificial arms have been made that have failed to stand the tests. Fortunes have been wasted in trying to produce the utopian hand, the hand that possesses the capabilities of the natural one.

Most of these devices have been cast aside simply because they were useless and burdensome. No person of the present time will tolerate a clumsy, heavy, noisy, complicated, and unwieldy arm. Neat adaptation to the stump, lightness, naturalness of appearance, durability, and utility to the reasonable point are the requisites of an acceptable substitute, and any device that is devoid of these qualities will not be tolerated.

An artificial arm must necessarily have limited uses, but when neatly made, and comfortably adapted, it becomes a valuable and indispensable companion. The arm conceals the loss, the same as the glass eye conceals the withered and visionless eyeball. It protects the stump, the same as the wig protects the hairless head. It restores a natural appearance to the dismembered side, the same as an artificial nose restores a natural appearance to the face that has been deprived of the nasal prominence. It provides a medium that forces the stump into healthful activity, and rescues it from that indolence that begets pains, throbbings, and distracting sensations. The artificial arm has still further functions. It is capable of assisting the opposite hand; it will carry articles of considerable weight. If the stump is sufficiently powerful the hand can be controlled by the stump so that it will cut meat on the plate and carry the morsels to the mouth. The hand will hold a brush that will be convenient in washing the remaining natural hand or in brushing the hair. A pen can be placed between the finger and thumb, and after a little practice the wearer will learn to write a quick and legible hand. A variety of implements can be made, each capable of distinct functions. A ring thus applied will help the farmer in guiding the handle of a plow, or the handle of any agricultural implement; it will help the blacksmith in wielding a sledge. A pair of pincers applied to the hand will be capable of holding the work of a jeweler; a claw hook, a clevice, or a hand vise has its valuable uses. A vast number of other implements can be attached to the hand, as the occupation of the wearer may demand. While these attachments are capable of a large range of adaptation, there is a limit beyond which art and science cannot go. Those operations of the natural hand that depend on the brain for their direction and power, cannot possibly be performed by the mechanical hand.

That intelligence with which the natural arm is endowed, is the result of the system by which mental force is carried from the brain through the nerves, muscles, sinews, and joints to the distant finger. The human arm and hand are marvels of mechanism, their combinations of motions are limitless, their functions are vast, and their capabilities are beyond comprehension. The motion of the shoulder is circum-

rotary, the motions of the elbow are flexion and extension, the motions of the wrist are rotary, circumrotary, flexion, and extension, and the fingers are capable of a range of accommodation that is astounding beyond conception. Every joint is connected by powerful tissues, sinews, tendons, muscles, nerves, and blood vessels. These perform their functions in conveying the commands of the mind to the most distant parts, and in compelling an instantaneous obedience. Everything is harmony—the hand that is capable of placing the delicate works of a watch is also capable of laying the stones of a cathedral; the surgeon's hand that can skillfully carry the scalpel is also capable of wielding the ax that will fell the monster oak. And yet the human arm is but a machine, useless and powerless by itself; the brain is the *vis viva* that renders it capable of its limitless uses. If the medium that conveys the wishes of the mind to the arm be destroyed, if the co-ordination be impaired, the arm ceases to be any more valuable than the artificial arm, made in the crudest and most unscientific manner.

An artificial arm, no matter how ingeniously it may be constructed, is so remotely comparable with the normal natural arm, that even the suggestion of a comparison brings a blush; but nevertheless that artificial arm is more responsive to the demands that may be made upon it than the natural arm that has become paralyzed, or so injured that it fails to respond to mental forces.

The natural arm has other endowments aside from its submissiveness to the will. The power of repairing itself is one of its mysterious attributes. The bearing surfaces of the bones would grind away and wear out were it not for the presence of cushions, lubricating sacks, and provisions for replacing the particles that become disengaged by work, overstrain, or accident. The tendons would stretch and become inactive if the repairing processes were not in constant operation. This power of repairing itself is not only present in the bones and tendons, but in every component of the arm. If a muscle becomes lacerated, or a tendon detached, or a bone broken, the work of reparation begins, and in a short time the injured part is fully restored. Every drop of blood that flows through the arteries carries new material to replace the waste, and every drop of blood that flows through the veins carries away the detached, diseased, and worthless particles. In old age, when the human repair shop becomes disorganized, the entire physical mechanism breaks down, and death soon follows.

Another great and important endowment of the natural hand, and one that is seldom thought of and hardly appreciated, is that of the sense of touch. This sense, although inherent, becomes cultivated so that the faculty of recognizing objects by the touch becomes acute. The contact of the fingers will convey the information (without the aid of vision) that the object is soft or hard, that the material is liquid or solid, dry or wet. The blind man is enabled to read by the sense of touch. Persons who are endowed with normal sight depend largely upon this sense. When we place our hands in our pockets, we know by this sense whether we take hold of a key or a jack knife, a silver dollar or a penny, a handkerchief or a lead pencil. And the moment we touch

the object, we know what motions of the fingers are required to put that object into our grasp. Persons whose sensory nerves have become paralyzed have a sad story of affliction to tell.

An artificial arm is absolutely devoid of sensation. Divinity has not privileged the most fruitful mind to endow the products of his thoughts with this power.

When we call to mind the fact that an artificial arm can be made with joints, springs, and cords, and that it cannot be endowed with mental sympathy, or with the power of repairing itself, or with the sensation of touch, we cannot help but become reconciled to the fact that it cannot be anything more than a substitute of limited capacity.

We are frequently amused by reading newspaper articles of artificial arms, made by forgotten mechanics, "that are fully as good as natural arms." We frequently have to listen to the narration of some magical performances of men who wear artificial arms. We recall an article that appeared in a Canadian paper some years ago, of a woman who had a pair adjusted to her person, supplementary to her natural ones. She became so dexterous in manipulating them that when in a public conveyance, she would hold a book in her artificial hands, and, while apparently reading, would, with her natural hands, pick the pockets of those who sat next to her.

We have read in the newspaper the story of a politician who lost his arm in the Civil War, and who had an ingenious artificial one applied that enabled him to shuffle a deck of cards, pick up a glass of beer and carry it to his mouth; and on one occasion, when in a barroom brawl, he liberated a spring, and the arm immediately began its pugilistic movements, with more vigor and with more deadly results than possible for a natural arm, and by this means he emptied a crowded barroom.

We have read a great many newspaper articles equally as absurd as the above, and, being acquainted with every method used throughout the world for the construction of artificial limbs, we brand all such stories as fabrications of poorly informed but highly imaginative newspaper correspondents.

The endeavor of all conscientious manufacturers has been to produce artificial arms that possessed the greatest range of utility. A few years ago manufacturers were more prone to complicate the structure than they are now. The severe lesson of experience has taught the older manufacturers that simplicity of construction is the only road to satisfactory results. Full finger movements, controlled by intricate mechanism, are ideas of the remote past. Limited finger movements are conceded to be more desirable and more advantageous. Any manufacturer of ordinary ingenuity can make a hand that will hold the reins of a horse, or that will carry a valise, but to make a hand that will assist in the performance of labor and be endowed with the power of prehension, delicate enough for some purposes and powerful enough for others, is too near the work of Divinity to be within human capabilities.

In the beginning of our endeavors we followed the lines of our competitors, and made a hand that gave us some pride. By taxing the remaining arm, we could force the artificial hand to open, and, by relaxing the strain on the connecting strap, it would close. We were not long, however, at experimenting on those lines before we became convinced of the absolute impracticability of such devices. Our attention was turned to the utilization of rubber. The resilient nature of that material seemed to us to be more accommodating than harsh, unyielding wood or metal. In 1863 the rubber hand was invented illustrated in Cut No. 910. It was attached to the forearm by means of a spindle, which admitted of rotation. The fingers were flexible, and would yield under pressure, having sufficient elasticity and adhesion to make it accommodating to a degree exceeding those made of wood. The hand was natural in appearance and pleasant to the touch. It was

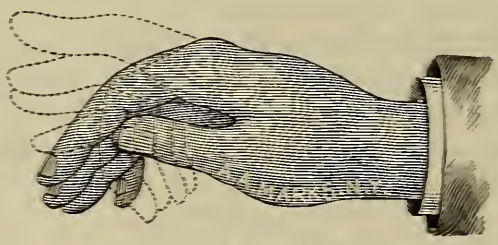
No. 910.

practically unbreakable; it might fall or strike any hard object, and it would not become disordered or impaired. It could be slipped from the socket, and a hook, knife, fork, or brush put in its place. For a number of years this hand found many purchasers, and was highly esteemed, but improvements were suggested from time to time, and the rubber hand patented in 1863 passed through a number of stages, until it reached its present stage of adaptation. It was a happy thought of the inventor—that of changing the fingers from flexibility to ductility. The flexible fingers would spring and move under pressure, but as soon as that pressure was removed the fingers would return to the positions in which they were cast. Ductility gave the fingers the advantage of change of positions to accommodate the wearer's wishes. The assistance of the opposite hand, or the pressing of the artificial hand against some resistant body, is all that is necessary to change from flexion to full extension—from the clinched to the open hand. The hand, partly closed, is capable of carrying a valise or package of considerable weight. Cut No. 911 represents the hand partly open. The dotted lines show how far the fingers can be flexed and extended.

An invisible lock is placed in the palm of the hand, rendering the hand capable of holding implements with firmness, thus enhancing its usefulnes.

Cut No. 912 represents the rubber hand with lock imbedded in the palm, designed to hold a hook, knife, fork, or brush. When the implement is placed in the socket and pressed downwardly, it becomes firmly locked. The wearer can press heavily upon any

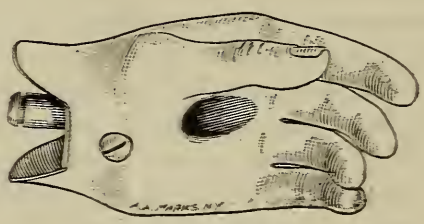
object or carry any weight that the stump is capable of supporting. A fork placed in this lock will enable the wearer to hold food on the plate while it is being cut with a knife held in the opposite hand, or will convey food to the mouth. A knife placed in the palm lock will enable the wearer to cut meat or other articles of food, mash potatoes, spread butter, and perform other services. A brush placed in the lock can be advantageously used to wash the opposite hand or brush the hair. A hook will enable the wearer to carry heavy articles and assist



No. 911.

greatly in the performance of labor. When it is desired to remove an implement from the hand, a little pressure applied to the button, A, will release the hold, and the implement can easily be withdrawn.

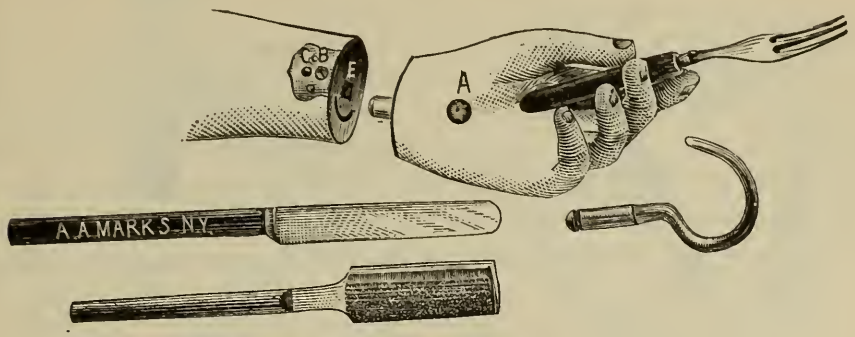
Rubber hands may be attached to forearms by various means. Cut No. 912 shows the spindle method. The spindle is attached to the base of the hand and is received into a locking plate which is secured to the extremity of the forearm. This locking plate holds the hand firmly, and at the same time admits of a slight rotary motion. When it is



No. 912.

desired to remove the hand, a little pressure applied to the button, C (Cut No. 913), will cause the lock to release its hold and permit the hand to be withdrawn. The rotary motion of the hand can be checked at any desired point by simply turning the set-screw, B; thus, if a man desires to have the hand set so that it will be either prone or supine, he can place the hand in the socket at either of these positions and turn the set screw, and it will remain set until the screw is loosened. The orifice in the center of the wrist lock is one-half inch in diameter, the same as the diameter of the socket of the palm lock. When the hand is removed, the wrist catch is capable of receiving any of the implements that can be placed in the palm catch; hence the implements are interchangeable, and can be used in either hand or arm.

Cut No. 913 represents a part of forearm with hand provided with wrist spindle; an implement is placed in the palm, showing the direc-

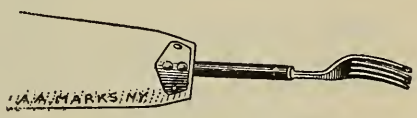


No. 913.

tion in which it is held. Cuts Nos. 914, 915, 916, and 917 represent ends of forearms with hands removed and implements of various kinds inserted.

The ball and socket method of connecting the hand with the forearm is illustrated in Cut No. 918. The end of the forearm terminates in a

No. 914.



No. 915.

small globe. This is received in the base of the hand, where it is held by a clamp.

A cuff (not shown in the cut) is attached to the base of the hand and incases the end of the forearm; it covers the space at the connection of the hand with the forearm. The ball and socket admits of universal

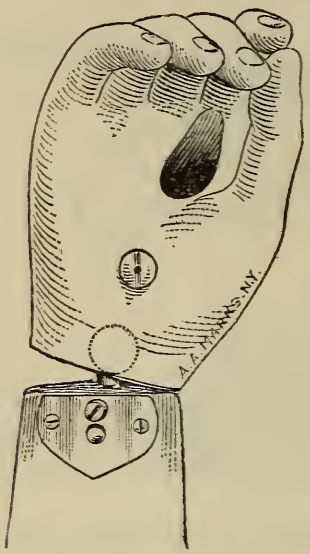
No. 916.

No. 917.

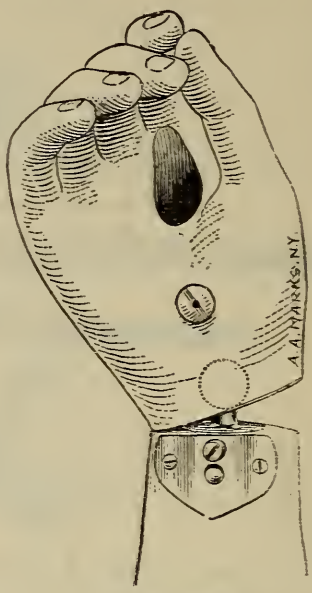
motion, palmar extension and flexion, and lateral extension and flexion, rotation and circumrotation. With some persons this combination is desirable, but with most persons it is worse than useless, as so much wrist motion deprives the hand of stability, and makes it impossible for the wearer to press heavily on an object.

Cut No. 918 represents a palmar view of hand with ball and socket connection. The cut shows the hand at its extreme right flexion, and Cut No. 919 represents the same at its extreme left flexion; the hand is capable of assuming any position between those limits.

Cuts Nos. 920 and 921 represent side views of the same, showing the range of palmar and dorsal flexion and extension. The hand is pro-

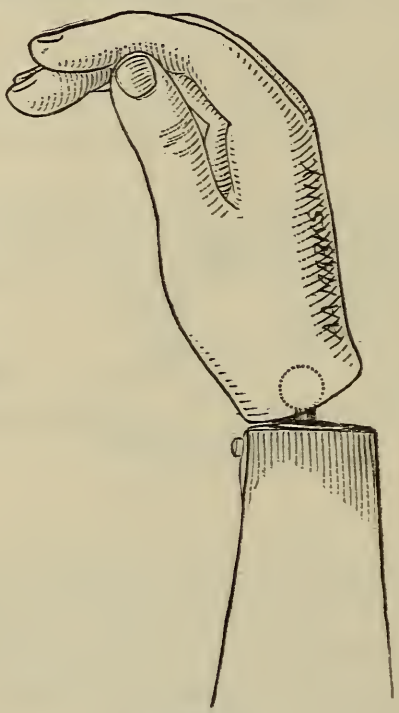


No. 918.

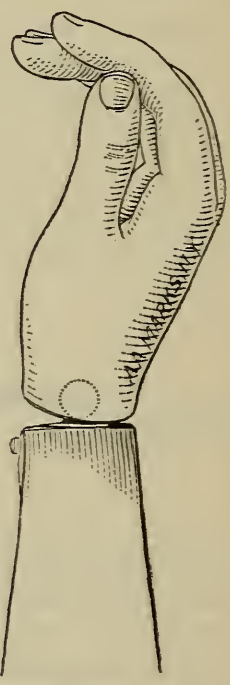


No. 919.

vided with palm lock, rendering it capable of holding implements, as before described. The ball and socket mechanism necessitates a round



No. 920.

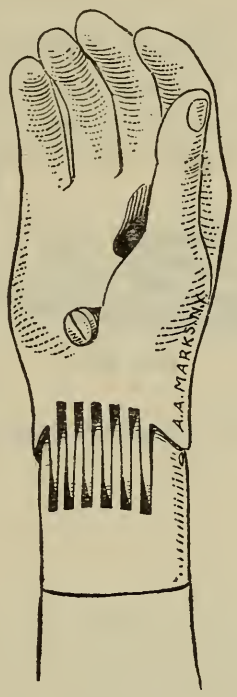


No. 921.

formation of the wrist, instead of the flattened one of nature. Those who attach importance to the shape of the artificial arm and hand are disposed to object to this, and prefer other hinged methods.

The mortise and tennon wrist connection admits of flexion and extension of the wrist without objectionably increasing the weight of the arm or departing from the graceful lines of nature.

Cut No. 922 represents the mortise and tennon connection. This method consists of a series of interlaying strips, held together by means of a bolt which forms the axis of motion, and a means for increasing or decreasing the friction that holds the hand in its various positions. The palm is provided with a palm lock, as heretofore described, thus rendering it capable of holding any of the implements previously referred to. Rotation of the arm is sometimes obtained by means of spindle connection introduced immediately above the mortise



No. 922.

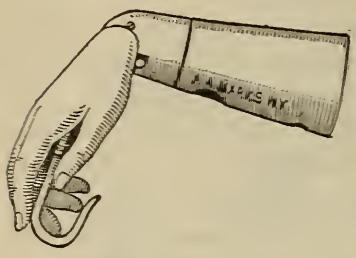
and tennon joint. This rotation is not always placed in an arm; sometimes the length of stump prevents it, other times it is not desired.

We do not advocate the use of any form of wrist connection that does not hold the hand to the forearm rigidly, unless utility can be sacrificed for ornament. A laboring man would find the instability of the hand, due to ball and socket or mortise and tennon connection, a hindrance rather than a help, while a society lady would find either connection desirable, as by it she will be enabled to place her hand in a variety of angles, thus destroying monotony, and adding grace to the pose of the artificial member.

Cut No. 923 represents the mortise and tennon hand flexed, and Cut No. 924 represents the same extended.

Any mechanism employed in holding hands to forearms add more or less to the total weight of the structures. It is often the case that

society ladies choose to sacrifice the advantages of wrist articulations in order to obtain minimum weight.



No. 923.

No. 924.

Cut No. 925 represents a forearm with hand permanently attached. In this method the hand is incapable of articulation at the wrist. Rotation is obtained by moving the socket on the stump. This method obtains stability, durability, and reduction of weight.

No. 925.

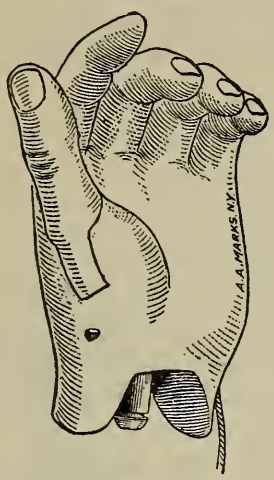
The palm is provided with palm lock capable of holding implements, as previously described.

SPRING THUMBS.

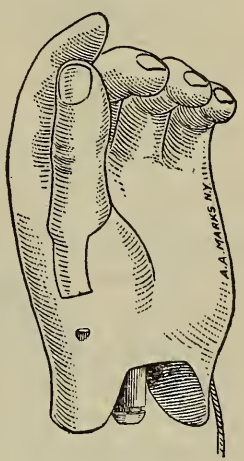
We have a mechanical device by which the thumb can be made to move at its base, away from or toward the fingers.

Cut No. 926 represents the hand with thumb abducted. This is done by contracting the cord passing from the underside of the base of the hand upward to the elbow.

Cut No. 927 represents the hand with thumb pressed against the fingers. As soon as the tension on the abductor cord is released, the thumb will be forced, by a strong spring, to press against the index and middle fingers. When the abductor cord is connected with the artifi-



No. 926.



No. 927.

cial arm above the elbow, the thumb will press against the forefinger when the elbow is flexed, and will abduct when the elbow is extended.

The abducting cord may be carried up the arm and over the back and around the opposite shoulder; it is then operated by a movement of the shoulder or a contraction of the chest.

Considerable mechanism is required in order to obtain spring thumbs; this complicates the construction of the arm and hampers the movements of the elbow and shoulder. In double amputations, when everything depends on artificial means, these complications are willingly submitted to; but when there is one natural hand remaining, which is endowed with all the functions of nature, the spring thumb becomes useless. The natural hand becomes so adept that it performs about all the work that was, prior to the amputation, performed by both hands, and the artificial hand will not be called upon to perform work that will tax the shoulders, elbow, or the natural arm; therefore, a spring-thumb hand for a single arm amputation invariably proves valueless.

With double amputations the conditions are different, dependence on artificial hands is absolute, and every motion that can be given is a desirable benefit.

In the above statements we are simply giving the experience of thousands who are wearing artificial arms.

NATURAL COLOR.

Artificial hands and parts of hands must be gloved at all times. While they may be modeled to natural shapes and have all the graceful lines, creases, and folds of nature, and while they may be painted and tinted with artistic nicety, it is not possible to impart to them those characteristics that distinguish nature from art. The natural hand has a different color in the afternoon to that which it has in the morning. When the fingers are extended there are more creases in the skin than when they are flexed. When the hand is at labor it is broader and the muscles and blood vessels show with more prominence than when at repose. An artificial hand cannot possess this metamorphic power; it will thus be seen that the constant use of the glove is unavoidable.

SOCKETS.

Sockets are made of wood, leather, or aluminum to suit the wishes of the purchaser. Makers of experience have almost to a unit settled upon light and tough wood as the most desirable material. Wood is capable of being worked into a more accommodating shape, and will retain its shape indefinitely; it is light and, when strengthened by rawhide, is sufficiently strong for ordinary purposes; it is also a non-conductor of heat. Leather is flexible, and while that may appear desirable, it is frequently a source of trouble. A socket that is flexible cannot possess sufficient rigidity to be adaptable to many uses. Leather absorbs perspiration, becomes foul and offensive to smell, and unless extraordinary methods are used to keep it clean, it will become hard and dead, and will crack and crumble to pieces. There are occasions, however, when leather sockets cannot be avoided. They will be spoken of in their order.

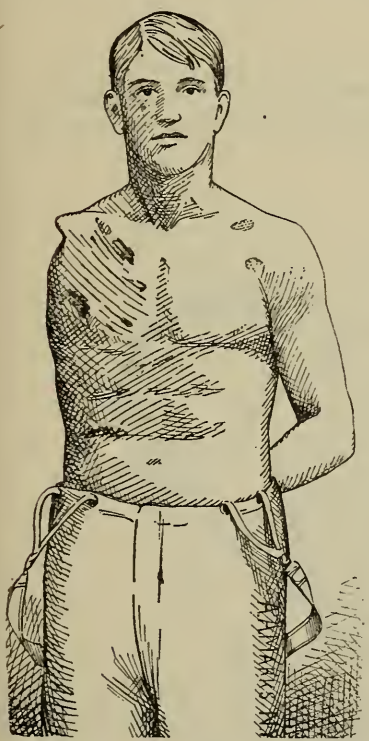
ALUMINUM.

Aluminum sockets are coming into greater demand, especially when applied to long fore-arm stumps. This metal possesses the rigidity of copper, and almost the lightness of wood. It has the advantage of being waterproof, and for parties who are obliged to plunge their arms in water or to work in wet places no better material can be employed. A rubber hand permanently attached to an aluminum socket will provide a useful, resistant, and durable arm. There are, however, two objections to aluminum, one of which is, that it is a metal and a conductor of heat and cold. In winter it is cold, in summer it is hot. In order to offset this objection, coverings of wool or any other non-conductor of heat have to be used. The second objection is that it

oxidizes under the chemical action of salt. Persons who perspire freely, and whose perspiration is largely charged with salt, must exercise extreme care to wipe the perspiration from the insides of the sockets every time they are removed from the stumps. If perspiration is allowed to remain on the walls of the socket it will eat into the metal and cause its early destruction. If a sweat-proof lining is placed in the inside of the socket, it must be watched closely and replaced when worn or when necessity requires. In ordering artificial arms, applicants are furnished with sockets according to their wishes. If no wish is expressed, sockets are furnished to suit the requirements according to the judgment of the maker.

ARTIFICIAL ARMS FOR SHOULDER-JOINT AMPUTATIONS.

Amputations that are made in the shoulder joints frequently cause the absence of integumentary stumps. Sometimes, however, the removal of the bone at the shoulder joint is done without the removal of the entire arm. A fleshy protuberance forming a stump is per-



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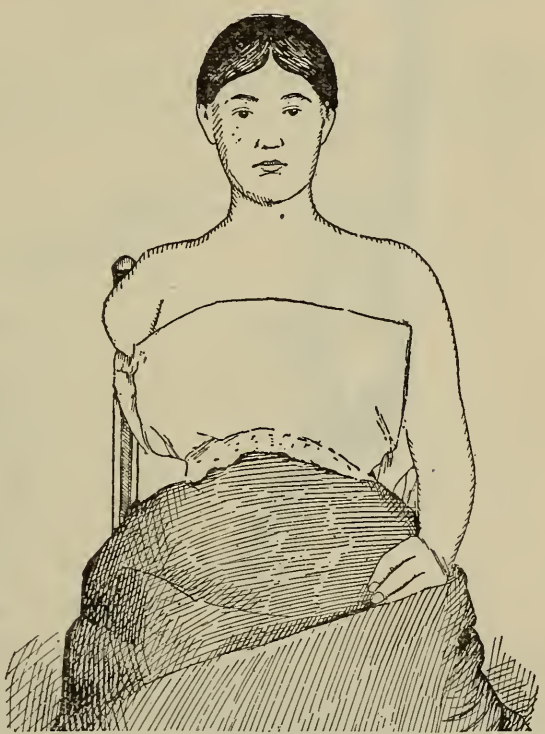


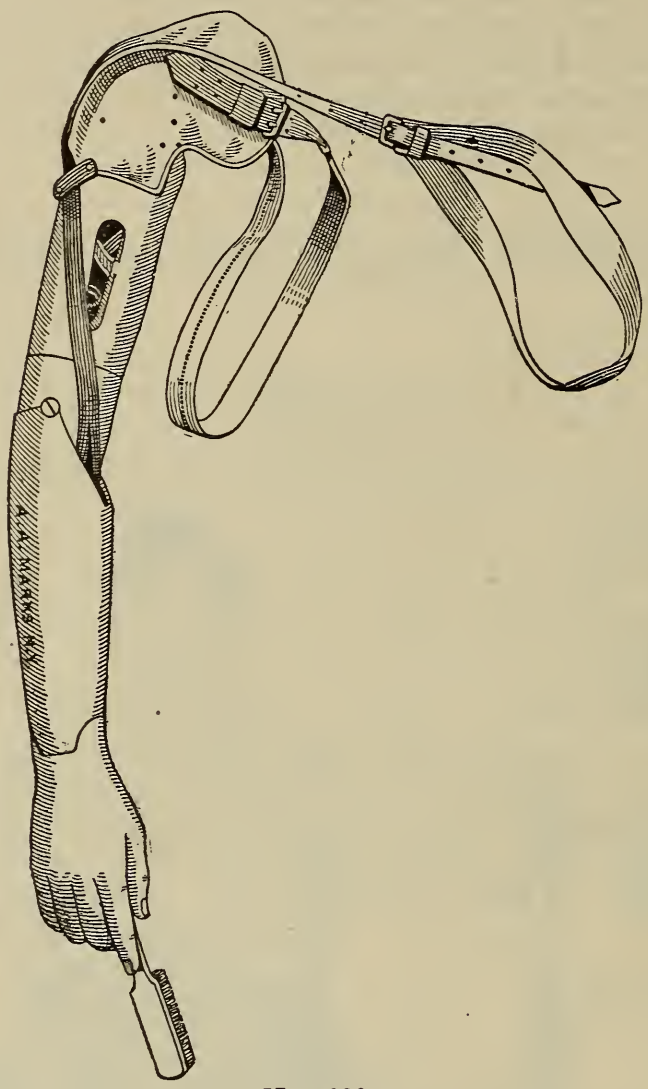
No. 929.

mitted to remain. In either case, an artificial arm can be applied which will serve the purpose of concealing the loss and restoring a natural appearance to the person.

Cut No. 928 represents an amputation in the shoulder. The entire arm is not only removed, but parts of the scapula and clavicle. Cut

No. 929 represents an amputation of the arm at the shoulder socket, with a very short integumentary stump remaining.

Cut No. 930 represents an artificial arm calculated for a shoulder-joint amputation. The arm is provided with a pad that rests on top of the shoulder, which is held in place by means of straps passing around the body. It is capable of rotating immediately above the elbow

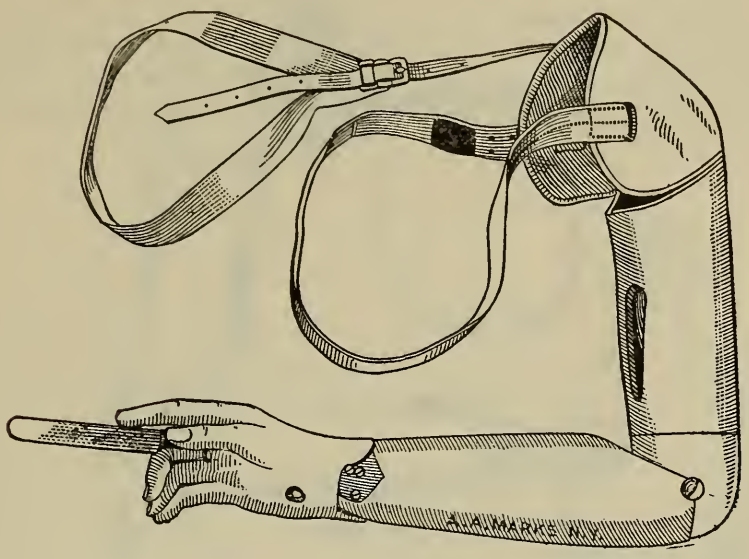


No. 930.

joint. The elbow admits of flexion and extension, which is controlled by a flexion strap, one end of which is fastened to the interior of the forearm, and the other passes around and under the opposite shoulder. A movement of the shoulders will contract this strap and bring the forearm to a horizontal position, where it is locked by a mechanical device which is concealed in the forearm. The release button to this lock is placed on the underside of the forearm, and easily accessible. The hand can be attached to the forearm by any of the methods referred to in the preceding pages.

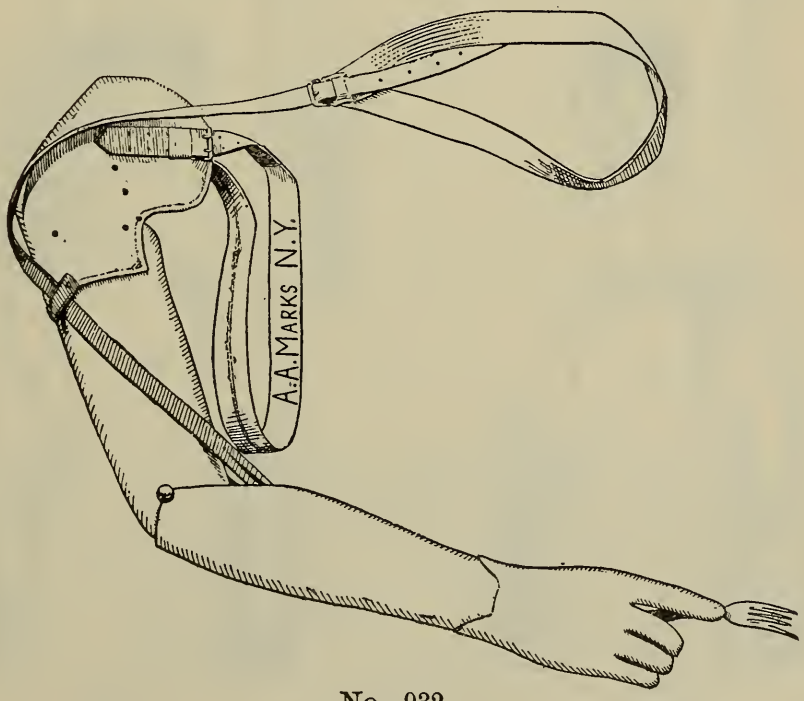
Cut No. 931 represents the arm at flexion, held there by the elbow lock.

Cut No. 932 represents the arm partly flexed.



No. 931.

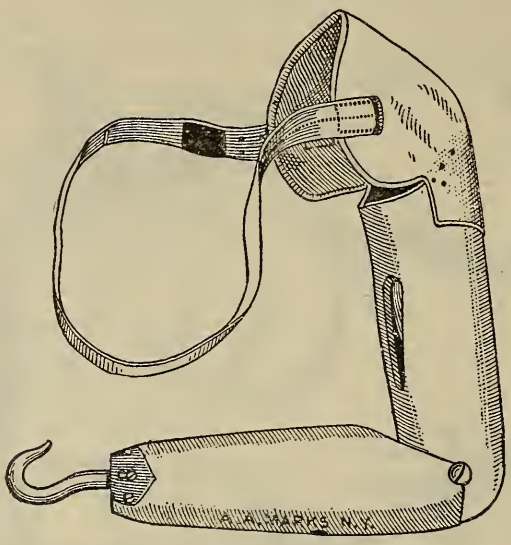
Cut No. 930 also represents the arm with brush in the palm, ready to be used to wash the opposite hand. Cut No. 931 also represents the arm



No. 932.

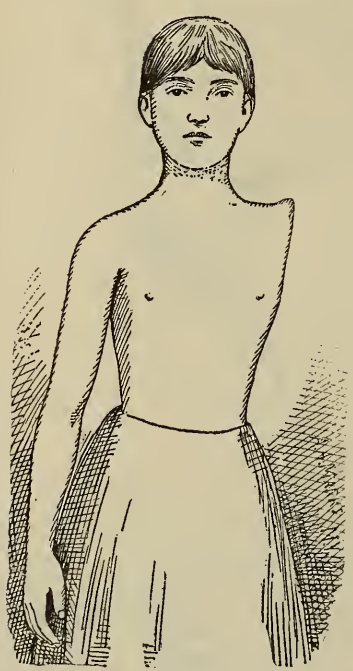
with knife in the palm, and Cut No. 932 with fork in the hand. Cut No. 933 represents the arm with hand removed at the wrist and a hook placed in the end of the forearm. This is the most desirable and

useful implement for a laboring man, especially if his arm is amputated at the shoulder.

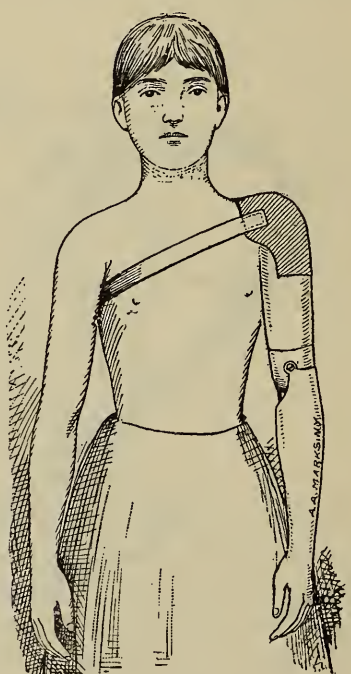


No. 933.

Aritficial arms for shoulder amputations are made with strict regard to minimum weight, and in order to attain this result the hand is



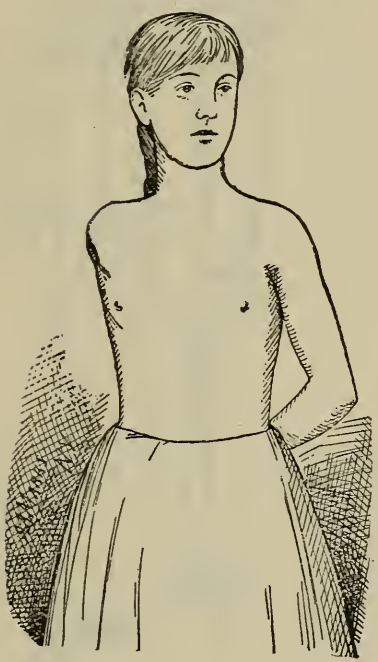
No. 934.



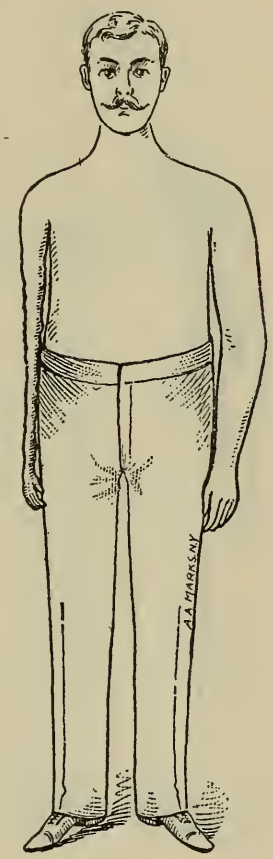
No. 935.

usually attached permanently to the forearm, and the extension strap is dispensed with.

Cut No. 934 represents a case of malformation. The child was born with only one arm. The right side was normally developed, but the left was deficient. The scapula turned abruptly upward at its farther extremity. This produced a knob on top of the shoulder. It was advised by the family physician that an artificial arm would perform the valuable service of keeping the body trim and encourage more uniform development; accordingly an arm was applied when the child was very young. Advantage was taken of the clavicle knob, and



No. 936.



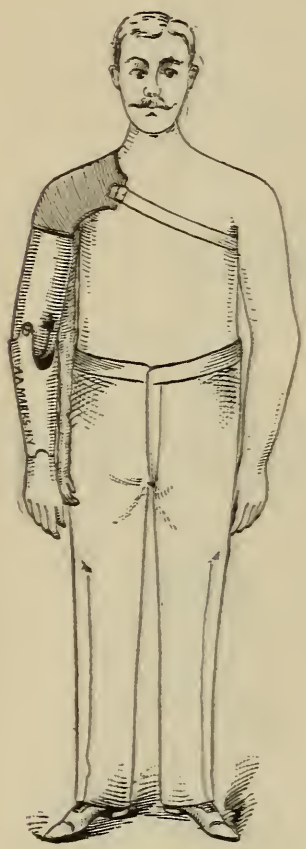
No. 937.

the artificial member depended largely for its support upon that prominence. Cut No. 935 represents the case with arm attached. This child became an adept. By a shrug of her shoulder she would throw her artificial arm forward, flex the elbow, and control its motions in a very natural manner; she grew to a lady of fashion, and is now frequently seen in society. She enjoys dancing, she flexes the elbow and rests the rubber hand on her partner's shoulder. She claims that she has passed many evenings at balls and receptions without arousing the slightest suspicion that her left arm was artificial.

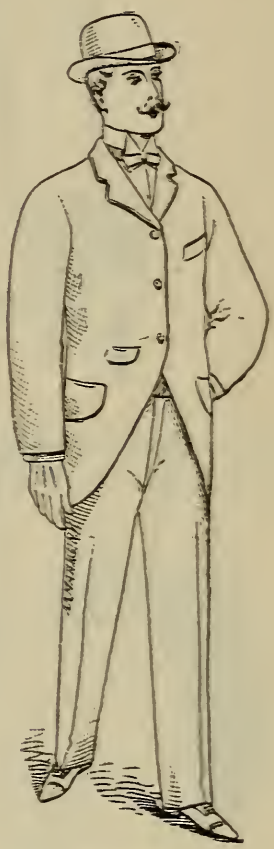
Cut No. 936 represents a shoulder-joint amputation of a young girl.

An artificial arm, style No. 930, was applied, with most gratifying results.

Cut No. 937 represents a European prince of distinguished lineage. When an infant he fell from his nurse's arms, which resulted in his right arm becoming paralyzed. As the child grew to manhood the paralyzed member maintained its longitudinal growth, but failed to develop in size, shape, or usefulness. It was limp and practically the same as if dead. While on a visit to America a few years ago, he was



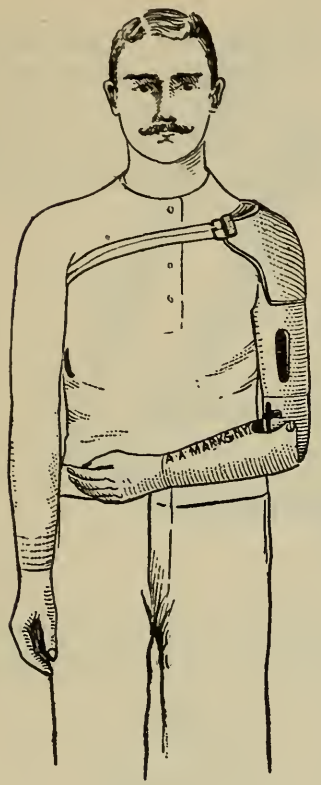
No. 938.



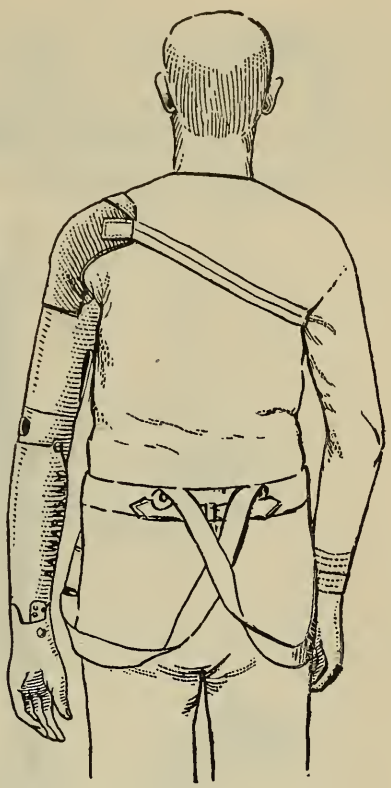
No. 939.

induced by an eminent physician to call on us. We found upon examination that the entire right side of the thorax was undeveloped, and that an artificial arm could be applied to that side without producing a disproportioned figure—an artificial arm constructed on the plan of No. 930 ; it was attached outside the withered member. The supporting structure was large, and covered a great area of the shoulder, chest, and back. This held the artificial arm in place, as shown in Cut No. 938. In dressing, the withered arm was, as always had been the custom, permitted to rest close to the body. The clothing was placed between the artificial and the withered natural arm, and when dressed the prince presented an appearance that was beyond criticism, as shown in Cut No. 939

Cut No. 940 represents the front view of a subject with No. 930 arm applied, and arm flexed. Cut No. 941 represents the back view of the



No. 940.

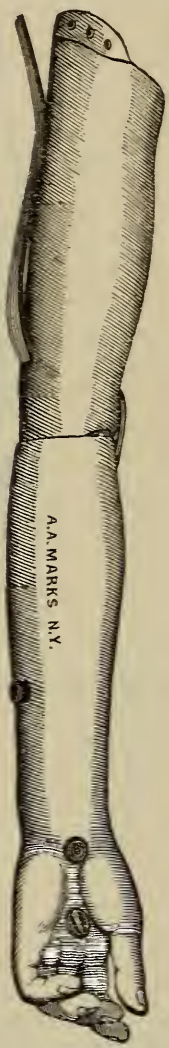


No. 941.

same. These cuts show the manner in which the straps support the structure.

ARTIFICIAL ARMS FOR ABOVE-ELBOW AMPUTATIONS.

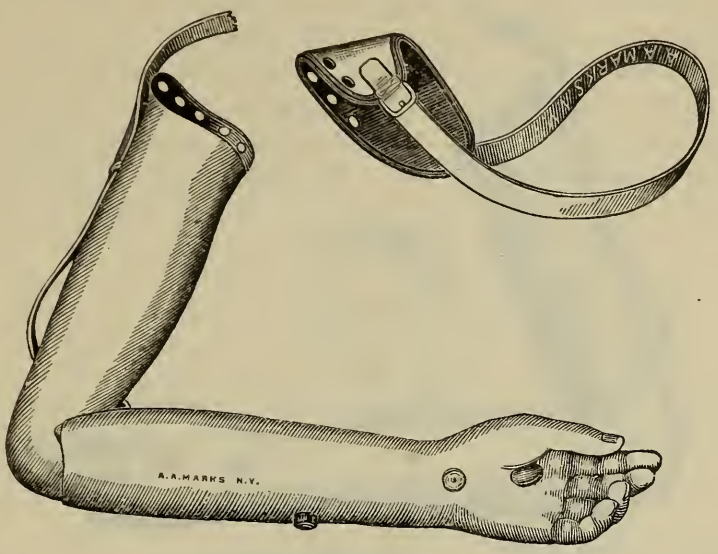
Cut No. 942 represents an artificial arm suitable for an amputation below the shoulder and above the elbow. Cut No. 943 represents the same flexed. The socket and forearm are made of wood. Both are excavated, the former to fit the stump and the latter to reduce weight. Both are covered with parchment to obtain strength, and are beautifully



No. 942.

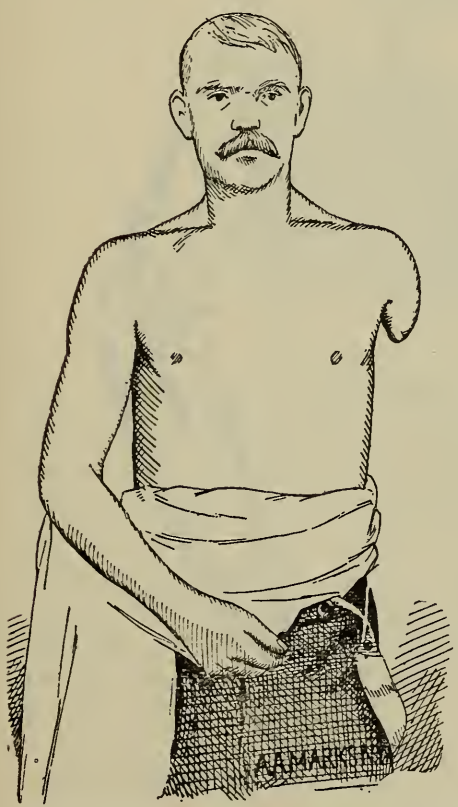
enameled by a natural-tint preparation. The hand is of rubber, as previously described, and capable of being attached to the arm by spindle, ball-and-socket, mortise-and-tennon joints, or by being rigidly connected. The latter is preferable when minimum weight is an object. The arm is capable of being locked at the elbow and, when the stump is not too long, it is made to rotate above the elbow. The locking attachment is released by pressure applied to the release

button found on the underside of the forearm. Suspenders are of various kinds, mostly as represented in Cut No. 943.

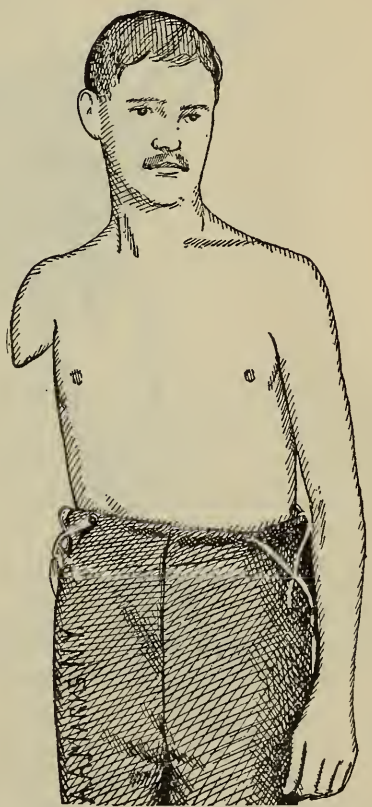


No. 943.

Cuts Nos. 944 and 945 represent above-elbow amputations, to which No. 942 artificial arms have been applied.



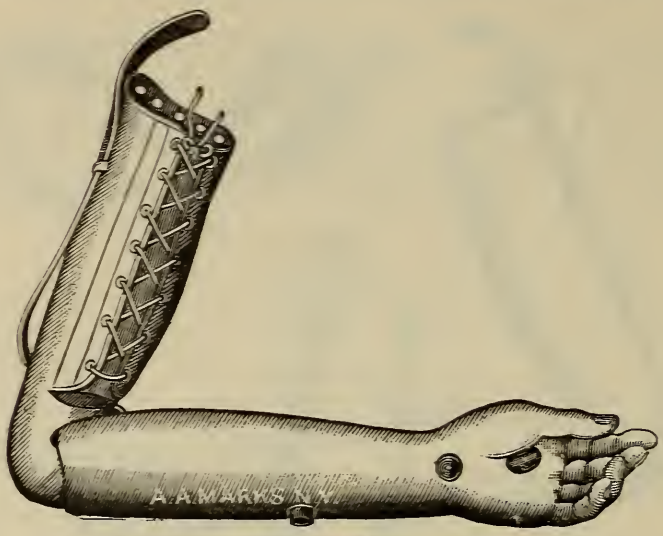
No. 944.



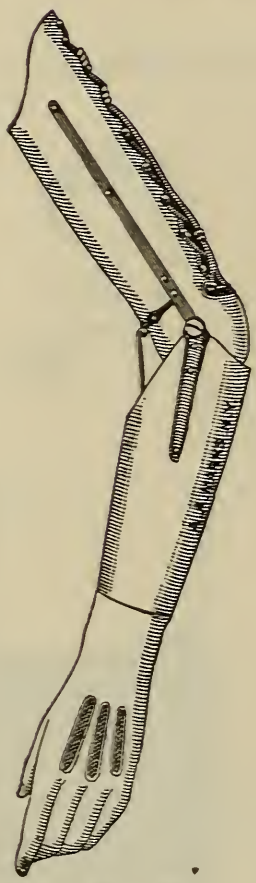
No. 945.

An arm for amputation above the elbow has some, although limited, utility. A hook can be placed in the palm of the hand or in the end of

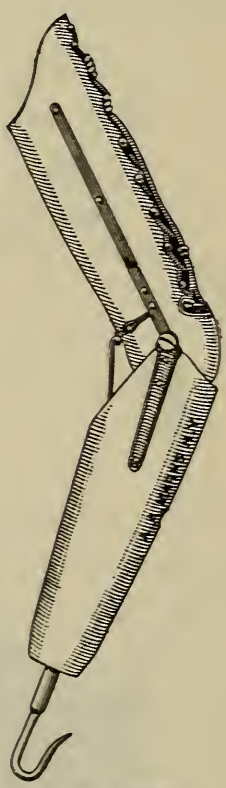
the forearm and the wearer be enabled to carry a valise, a pail, bundle, or other weighty object. The arm will keep the stump in a state of



No. 946.



No. 947.



No. 948.

activity, and be a source of great comfort and relief. When the stump is long and powerful, the elbow can be flexed by a movement of the shoulder; and when short, by a shrug of the shoulders.

The locking attachment in the elbow meets with much favor. The

ability to carry a shawl, a muff, or a purse in the hand while the arm is flexed is very desirable. The main purpose, however, is the ornamentation of the body by restoring it to its natural appearance. In this respect and that of providing a means that will force the stump into healthful activity, it proves a valuable and profitable possession.

Cuts Nos. 946 and 947 represent artificial arms designed for amputations at the elbow joints, or so close that the stumps are of no available use. No. 946 style admits the stump from the front, and No. 947 admits the stump from the back. The upper parts of Nos. 946 and

No. 949.

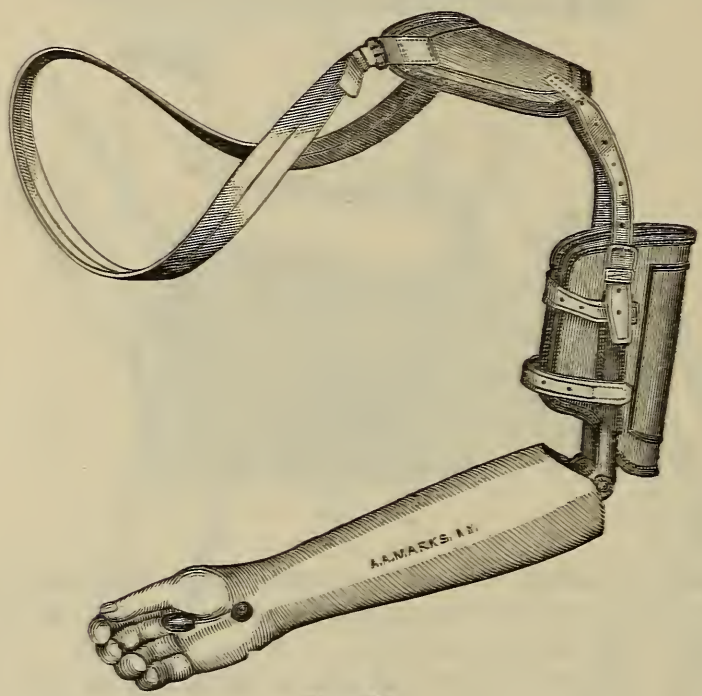
947 are made of leather, formed to accommodate the irregularities of the stumps. The forearm of each is made of wood, excavated to reduce weight, and covered with rawhide to obtain strength. A locking attachment at the elbow holds the arm at right angles when desired. The hand can be attached to the forearm by any of the methods previously described. Usually the socket is so fitted as to hug the smaller parts of the arm above the joint, and thereby obtain sufficient security without requiring shoulder suspension. When shoulder suspension is required, similar devices are employed as those described in Fig. 943.

Cut No. 948 represents No. 947 arm with hand removed and hook substituted. This is a very valuable feature for a laboring man.

Cut No. 949 represents an amputation a little below the elbow joint, leaving a stump so short that it cannot be availed of to move the forearm, thereby necessitating the use of the arm illustrated in Cut No. 947.

ARTIFICIAL ARMS FOR BELOW ELBOW AMPUTATIONS.

Cut No. 950 represents an artificial arm calculated for a short stump below the elbow (less than three inches in length). The hand is made of rubber, and provided with any of the means heretofore described for connection with the forearm. The socket is made of wood, leather, or aluminum, as may be selected; when no choice is expressed we assume that a wooden socket is preferred. In any case the socket is made to accommodate the stump and possess the likeness of the natural arm, as nearly as the conditions will admit; it is covered with rawhide and enameled with a water-proof preparation. The part that encases the

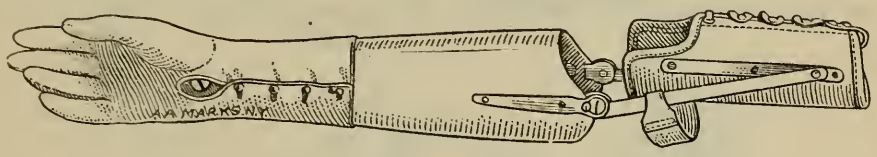


No. 950.

arm above the elbow is made of flexible leather, the elbow joints are of steel, made upon the ginglymoid plan; they provide for flexion and extension. Shoulder straps are applied to assist in supporting the arm and to remove the necessity of compressing the biceps uncomfortably. It is optional with the wearer whether he shall use the suspenders and not compress the biceps, or whether he shall compress the biceps tightly enough to hold the arm in place and dispense with the suspenders. He can change from one plan to the other after the arm is obtained. The fingers are sufficiently strong to enable the hand to

hold considerable weight. When a hook is placed in the palm, and concealed by the fingers, a greatly increased weight can be carried.

Stumps that are short and flabby require duplex side joints, that will allow the upper arm pieces to oscillate.



No. 951.

Cut No. 951 represents an arm with duplex joints; the two centers of motion admit of a movement in the upper part that accommodates

No. 952.

the irregular movement of the elbow joint, and prevents the crowding and the folding of the tissues at the front of a short and flabby stump.

Cut No. 952 represents an arm applied and held at full extension.

Cut No. 953 represents the same, with arm flexed at elbow. A comparison of these two cuts will show that in passing from extension to flexion, the elbow has traveled backward and the duplex joints have not interfered with its movement. This obviates the crowding of the tissues and permits a long range of articulation.

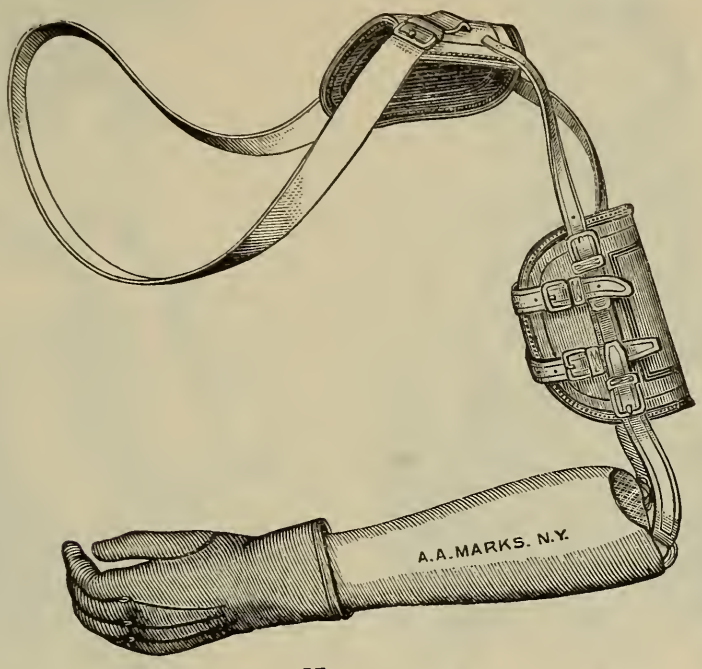
Duplex joints are only applied to arms for short and flabby stumps. They are entirely unnecessary for moderately long ones. It is our

No. 953.

desire to simplify the construction of artificial limbs without sacrifice of advantage. We, therefore, do not use the duplex joints except when conditions actually demand.

Cut No. 954 represents an artificial arm for a long forearm stump. It is constructed essentially the same as No. 950, differing only from that in the matter of elbow joints. Leather straps are used instead of steel joints; this modification is desirable, as it admits of more freedom at the elbow, permitting the artificial arm to extend, flex, and rotate with greater facility. A stump must, however, be three or more inches in length in order to hold the socket firmly, otherwise leather straps will not be effective; they are durable, do not need oiling, are abso-

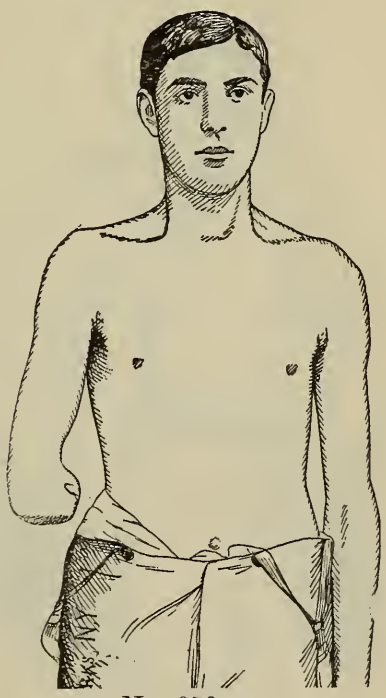
lutely noiseless, and when worn out can readily be replaced by a local harness maker or shoemaker.



No. 954.

Shoulder straps are always applied ; they can be used or discarded at the option of the wearer.

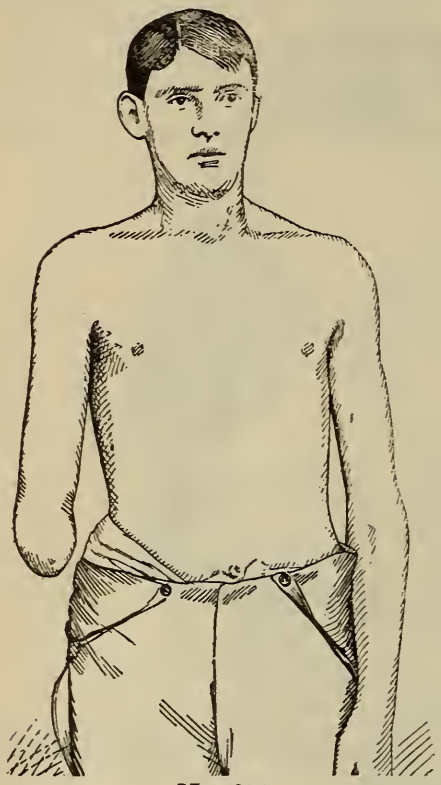
No. 955.



No. 956.

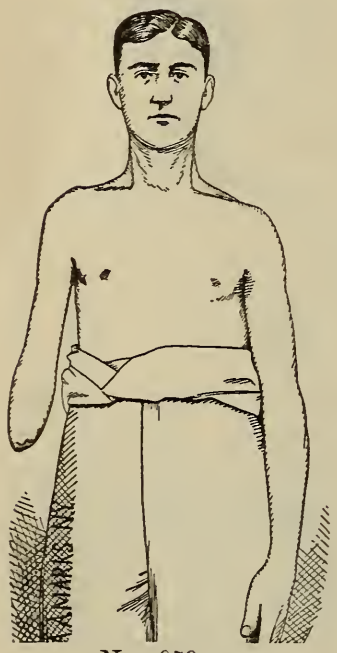
Cuts No. 955 and 956 represent stumps to which style No. 951 artificial arms were applied. The stumps were so short below the elbows that duplex joints were required.

Cuts No. 957 and 958 represent short forearm stumps that have been comfortably accommodated with style No. 950 arms.



No. 957.

No. 958.



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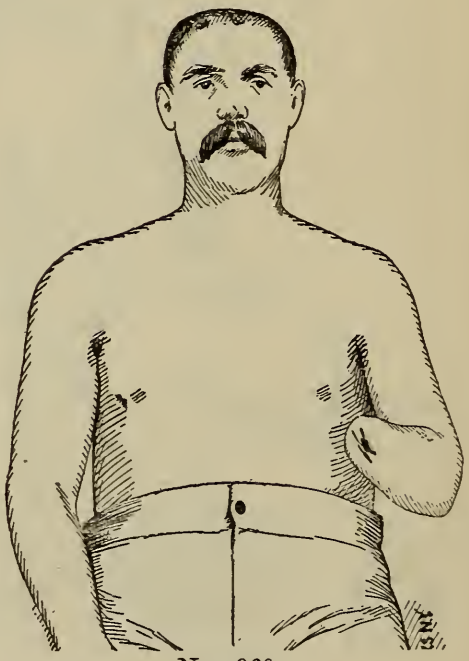


No. 960.

Cuts No. 959, 960, 961, 962, 963, and 964 represent forearm stumps of various lengths. Artificial arms constructed on the plan of No. 954 have been applied to these cases with gratifying results.

No. 961.

No. 962.

No. 963.

No. 964.

Price for any of the arms described for amputation below the elbow, each $50.00.

Cut No. 965 represents an artificial arm for a long and strong stump below the elbow. It is not provided with upper arm part, but a leather arm belt is connected with the socket by straps.

No. 965.

This method of attachment is highly satisfactory when the artificial arm is not used for carrying heavy articles or performing hard work. For light office work, when the stump is well healed and conditions favorable, it proves ample and satisfactory. When the strap around the arm above the elbow is intolerable, a double strap can be attached to the socket and carried up the arm, over and around the opposite shoulder.

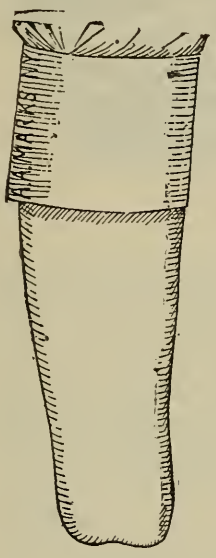
Price, complete, $40.00.

ARMS FOR WRIST-JOINT AMPUTATIONS.

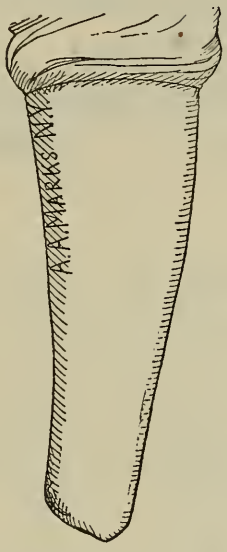
The amputations of hands at the wrist articulations leave stumps that must be put under two separate classes. First, those that are tapering, due to the removal of the styloid processes of the ulna and radius. Second, those that are flattened and broad at the extremities, due to the presence of the styloid processes.

FIRST CLASS.

Cut No. 966 represents a stump extending to the wrist. The removal



No. 966.



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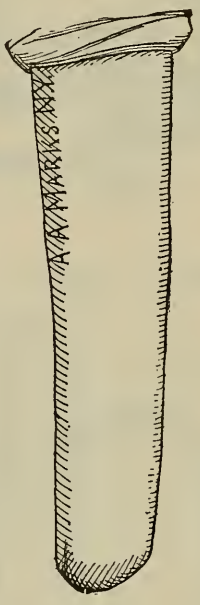


No. 968.

of the bony processes has made the extremity smaller than any other part.

Cut No. 967 represents a stump extending to the wrist. In removing the styloid process of the radius, that bone became shorter than the ulna.

Cut No. 968 represents a stump extending to the wrist, with the processes removed. It has its smallest dimensions at the extremity.

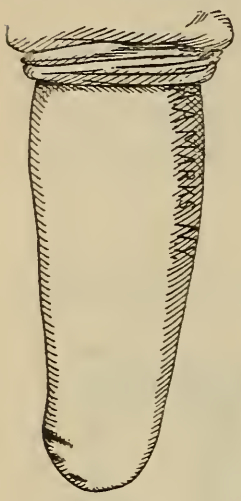
Cut No. 969 represents a stump extending to the wrist, with the processes removed and the tissues puckered considerably on the under side ; the stump consequently a tapering one.

Cut No. 970 represents a stump extending to the wrist, with the processes partly removed, the extremity sensitive, incapable of bearing pressure.

Cut No. 971 represents a wrist-joint amputation, with processes partly removed. The styloid process of the ulna is removed obliquely, producing a shortening of the ulna side of the stump.

Cut No. 972 represents a tapering stump extending to the wrist.

Cut No. 973 represents a wrist-joint amputation, with trimmed ulna and radius. None of the stumps above described have styloid prominences.



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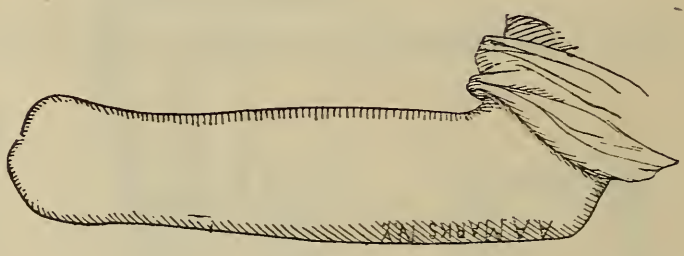

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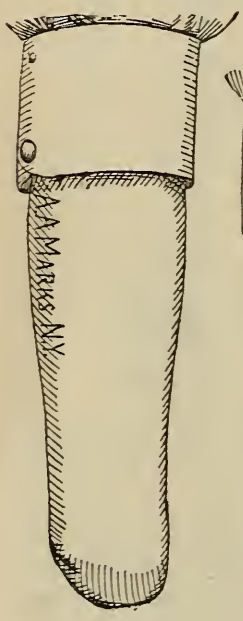

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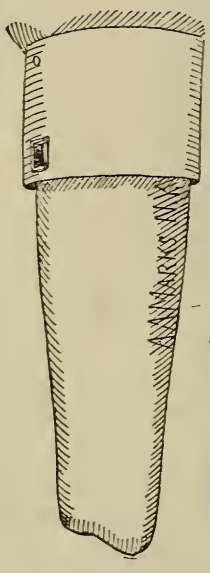

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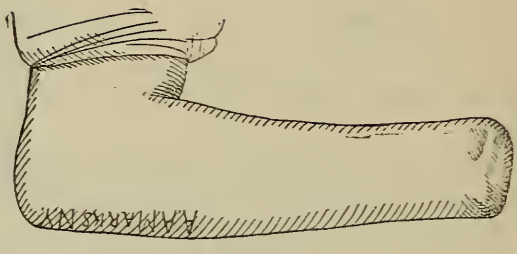
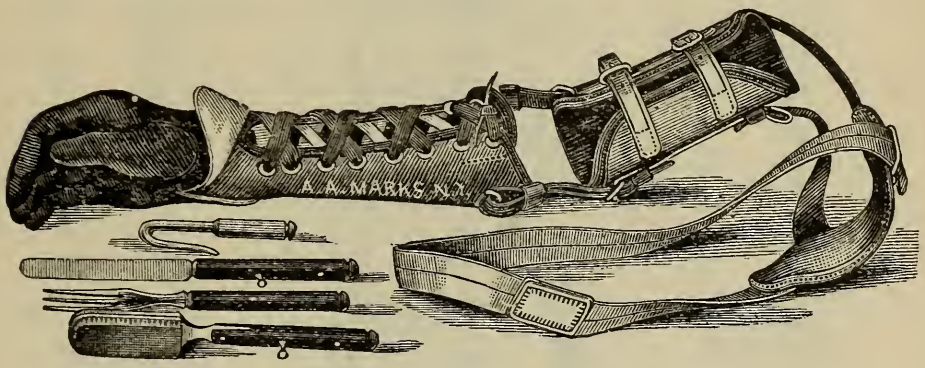


No. 973.

Cut No. 974 represents the usual form of artificial arm suitable for any of the stumps above described. The arm is constructed with leather socket, both above and below the elbow. The forearm socket is capable of distension and contraction, by means of which the stump can be put in place, and the socket laced so tightly that the stump will have uniform bearings. The upper-arm piece is regulated by straps and buckles and held at the proper distance from the forearm part. It is made to compress the muscle by means of a

lacing. The hand is attached permanently to the forearm, as the length of the stump prohibits the appropriation of room necessary for the introduction of any of the forms of wrist mechanism. If, however, the wearer is willing to have the artificial arm an inch longer than the natural one in order to remove the hand from the socket, he will be so accommodated. The introduction of either the spindle, ball and socket, or mortise and tennon connection requires about an inch of space, and this must come beyond the extremity of the stump. It is



No. 974.

a great convenience to be able to slip the hand from the socket and place a hook, knife, fork, or brush in its place. It is also a convenience to have the artificial arm the same length as the natural one. It remains for the wearer to decide which of the two conveniences he can better sacrifice. When the hand is permanently attached, the utility of the member is not greatly abridged, as the socket placed in the palm of the hand is capable of holding any of the implements heretofore described.

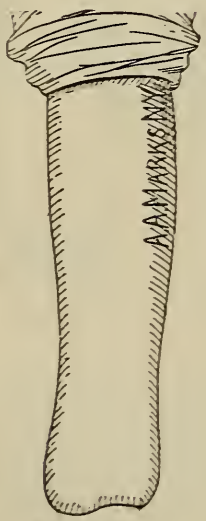
If the wearer objects to leather he can have the socket made of wood or aluminum, in either case it will be better to make the socket tubular and use side straps, for supports, extending above the elbow.

SECOND CLASS.

Cut No. 975 represents a wrist-joint amputation in which the styloid processes were permitted to remain. Cut No. 976 repre-

No. 975.

sents a similar stump. Cut No. 977 represents a wrist-joint amputation in which the bony processes of the ulna and radius were retained, and a large integumentary posterior flap was carried



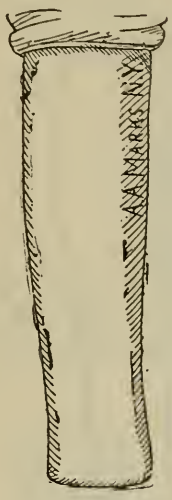
No. 976.

No. 977.

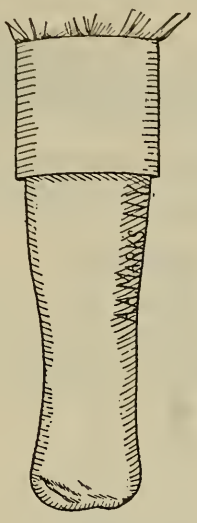
No. 978.

over the extremity and sutured laterally across the palmar aspect of the stump. Cut No. 978 represents a wrist-joint stump with little or no protection upon the extremity. The bony processes of the ulna

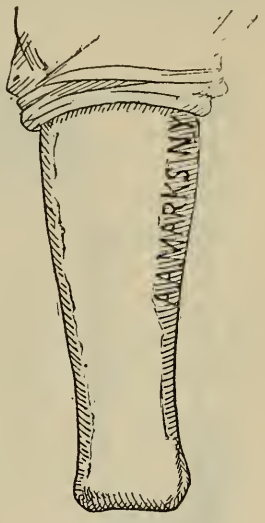
and radius were permitted to remain. Cut No. 979 represents a wrist-joint stump with a flattened extremity, the bony processes retained. Cut No. 980 represents a well-protected wrist-joint stump, the bony processes present. Cut No. 981 represents a wrist-joint amputation, the



No. 979.

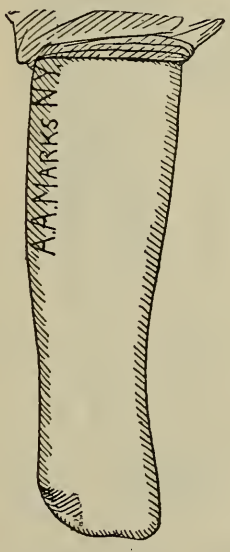


No. 980.

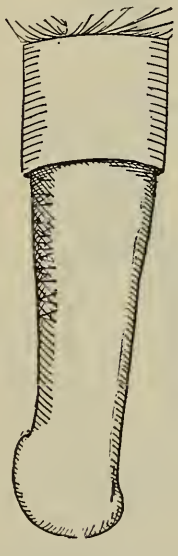


No. 981.

styloid processes present, but the articulating services of the wrist were trimmed, and the end incapable of bearing pressure. Cut No. 982 represents a wrist-joint amputation, with the bony processes present. Cut No. 983 represents an amputation through the base



No. 982.



No. 983.

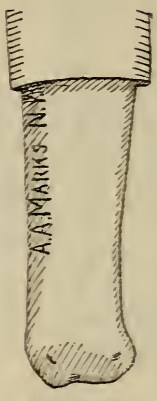
No. 984.

of the hand. Instead of amputating through the articulation, parts of the scaphoid and semi-lunar bones were permitted to remain. Cut No. 984 represents an ordinary type of wrist-joint amputation, and Cut No. 985 represents a wrist-joint stump, with the styloid process of the ulna remaining, but the styloid process of the radius

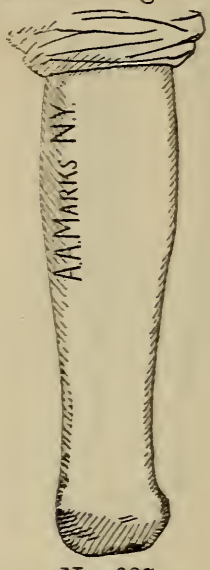
trimmed. Cuts Nos. 986, 987, 988, 989, and 990 represent the usual types of wrist-joint stumps, with the bony processes of the ulna and radius remaining.

Cut No. 991 represents an artificial arm, especially designed for all stumps of the second class. The socket is made of strong leather,

No. 985.



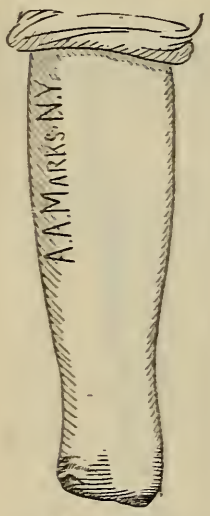
No. 986.



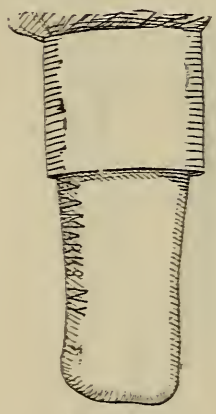
No. 987.

re-enforced by rawhide. It is formed on a last of accommodating shape. The hand is of rubber, with palm lock as heretofore described.

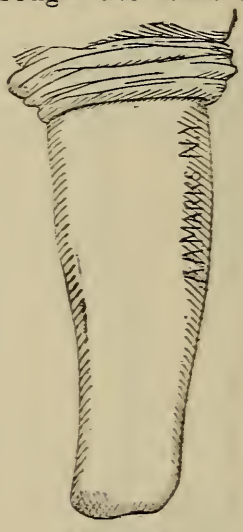
The styloid processes make the diameters through the ulna and



No. 988.



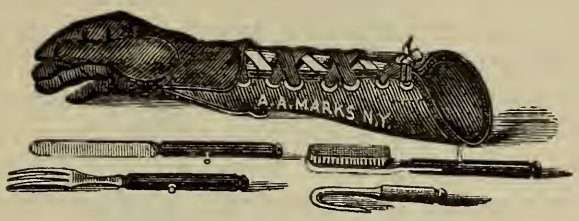
No. 989.



No. 990.

radius very large, thus providing means by which the arm can be held to the stump without requiring attachments above the elbow or over the shoulder. On account of the length of these stumps it is deemed advisable to attach the artificial hands permanently to the sockets. Rotation can be obtained by the stump, same as when the natural hand is present. A full line of implements, a hook, fork, knife, and brush, is shown in the cut. The hand is gloved, as it

is supposed to be when in use. Cut No. 992 represents the back part of the arm and hand. The glove is removed and a fork has been placed in the palm. This implement is of great use at the table. It will convey morsels of food to the mouth, and will hold meat on the



No. 991.

plate while it is being cut. The fork can be removed and a knife substituted, which has its own valuable uses. A hook can be placed in the hand when it is desired to lift and carry heavy articles, and

No. 992.

No. 993.

No. 994.

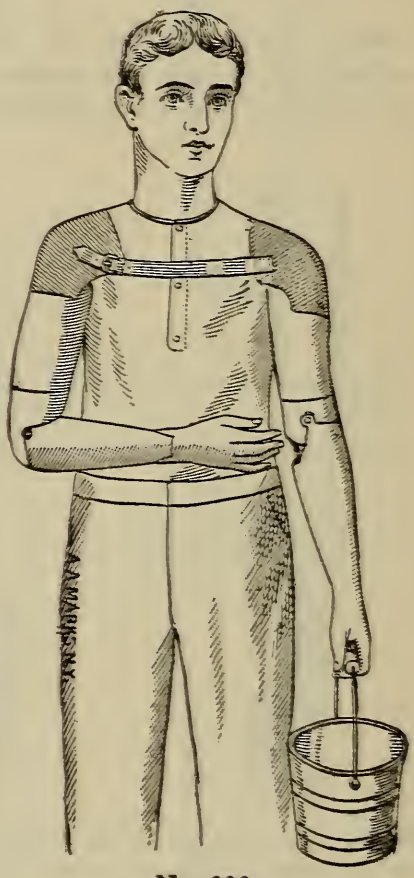
when it is desired to wash the natural hand, a brush can be placed in the palm and used to advantage. Cut No. 993 represents the arm with hook in the palm, and Cut No. 994 represents the arm with brush in the palm. The implements are held with firmness when placed in the socket, and enable the wearer to perform an unlimited variety of work. When the styloid processes will not submit to pressure, and the subject cannot depend on the lacing socket for security, it is advisable to connect the upper part of the socket with suspenders that can be carried above the elbow or around the shoulders. This attachment will hold the arm very securely in place and is desirable when the arm is to be worn by a person who is required to occasionally lift or pull with the artificial arm. If the wearer's habits are sedentary, the suspender is not needed and should be discarded. A sock should always be worn on the stump for protection and cleanliness.

Price $30.00 each.

ARTIFICIAL ARMS FOR DOUBLE AMPUTATIONS.

A person who has been deprived of both arms presents the strongest plea to the artificial arm maker. If both arms are amputated above the elbows his condition is the most deplorable. He is neither able to feed himself, prepare his food, dress himself, nor attend to the demands of nature. Something must be done to ameliorate his condition, otherwise he is forced into habits that are revolting, or he remains a helpless dependent upon others. Anything that will help him out of this condition, no matter how little, will be a benefit, and should be done without hesitation.

No. 995.

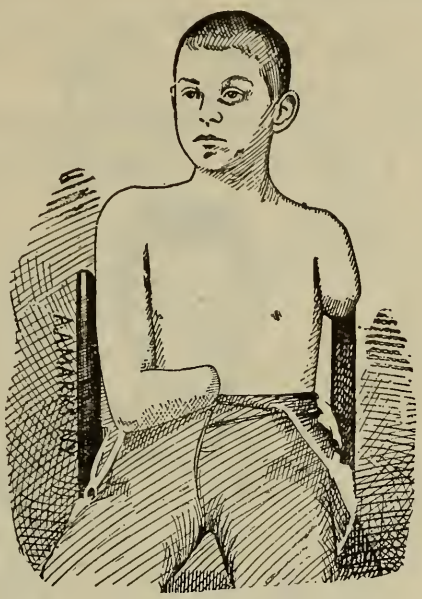


No. 996.

Cut No. 995 represents a young man who had both of his arms crushed by a railroad accident, which resulted in amputations above the elbows. Cut No. 996 represents the same person with a pair of artificial arms applied; as may be surmised, the arms were of very limited use, but notwithstanding that fact they mitigated his affliction to a considerable degree. By a shrug of the right shoulder he was able to bring the artificial forearm to right angles, in which position it would remain; this provided a means by which articles could be laid on his forearm and carried. His left arm could be flexed by means of the stump, which was long and powerful; when at extension a pail or basket could be carried in the hand, and many services could be performed. The

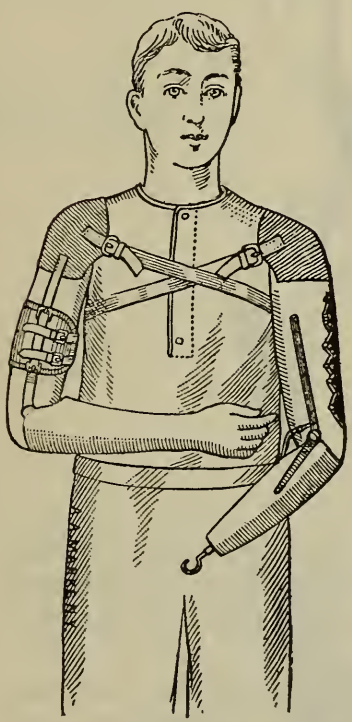
arms contributed to the young man's comfort, and rescued him from a life of absolute idleness.

Cut No. 997 represents a case of the right arm amputated above the

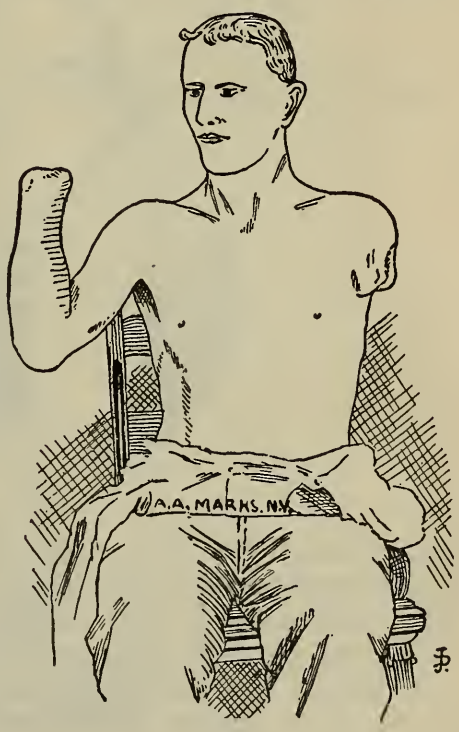


No. 997.

wrist and the left above the elbow. Cut No. 998 represents a pair of artificial arms applied. The right arm was under control of the natu-



No. 998.



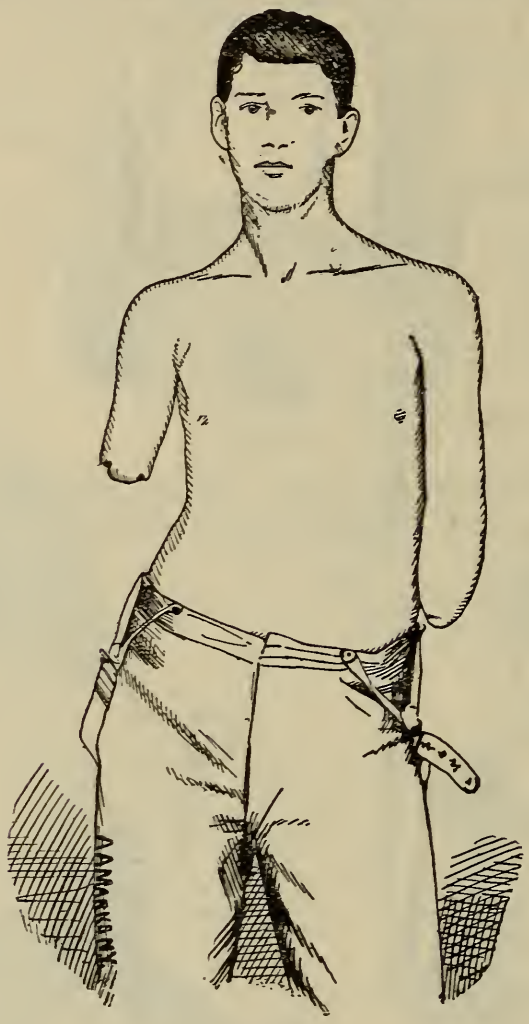
No. 999.

ral elbow and able to flex and extend, the hand was capable of holding a variety of articles, and by the use of implements placed in the palm, the young man was capable of performing considerable work. The

left arm could be flexed and extended at the elbow, by means of an extension strap passing over the shoulders; a hook in the left arm was frequently used instead of the hand.

Cuts Nos. 999 and 1000 represent cases of double-arm amputations somewhat similar to those described. Artificial arms have proved to be indispensable in both cases.

Cut No. 1001 represents an artificial arm constructed on the plan of No. 942 applied to a right side, and an artificial arm constructed



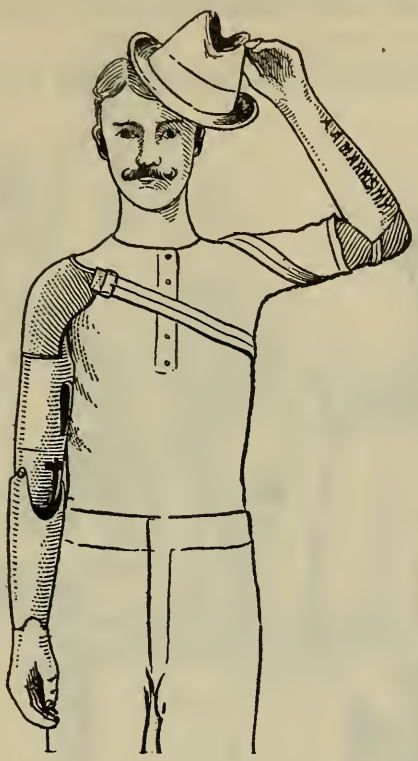
No. 1000.

on the plan of No. 965 to a left side. Both hands were provided with spring thumbs, which were operated by the contraction of the thumb cords, thus enabling the wearer to remove his hat from his head, pick up articles and hold them with firmness.

By the aid of artificial arms this man became capable of providing for his own support. Without them he would continue to be a burden to his family. To avoid any misunderstanding, we repeat the fact that while artificial arms proved to be helpful and invaluable to this person, his disabilities were but partially removed.

Cut No. 1002 represents a double amputation below the elbows.

Artificial arms applied to amputations below the elbows are far more useful than those applied to amputations above the elbows.



No. 1001.

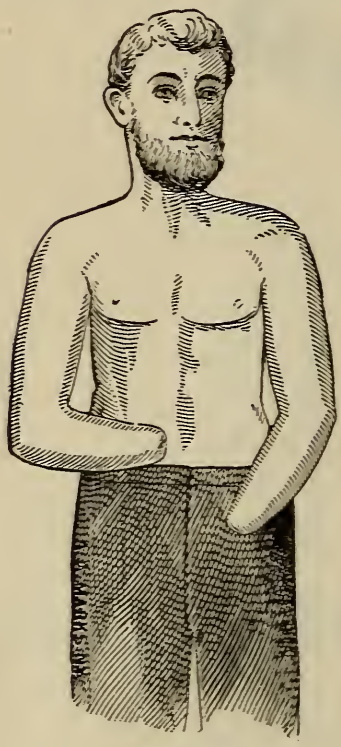
Natural elbow joints are of great value in the management of the attached arms.

No. 1002.

Cut No. 1003 represents a double amputation of forearms. Both stumps long, extending nearly to the wrists. Cut No. 1004 represents a pair of artificial arms applied. The wearer was enabled to prepare

his food at the table, convey it to his mouth, perform labor of a great variety, carry articles of considerable weight, write a legible letter, open and close the door, and could attend to the adjustment of his own attire to a considerable extent.

The use of spring thumbs is always desirable in double-arm ampu-



No. 1003.

No. 1004.

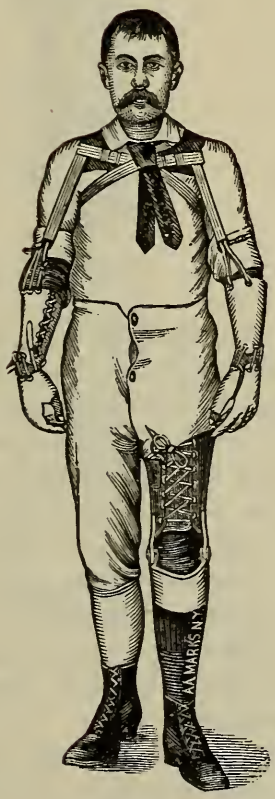
tations, and unless otherwise instructed we assume that the wearer desires to have them introduced in the hands he is ordering.

It is neither necessary nor desirable to apply spring thumbs to arms for single amputations, for reasons that have been given under the caption "Spring Thumbs."

Cut No. 1005 is one of the living evidences of the severity of the blizzard of March, 1887. This man was attending to his duties in the railroad service when the unexpected storm came upon him, and before he could find shelter both feet and both hands were frozen. He was discovered in an almost lifeless condition and taken to a hospital. It was found necessary to amputate the right hand through the metacarpals, the left hand near its base, the great toe of the right foot, and the left foot a little above the ankle. Cut No. 1006 represents a pair of artificial hands and one artificial leg applied. Each hand was made with moving thumbs, which were connected with levers that were operated by the forearm. When the stumps were flexed the levers would force the thumbs to close with considerable power; when the stumps were extended the force applied to the

levers was reversed and the thumbs were caused to abduct. A leg was applied to the left lower extremity, and by these appliances

No. 1005.



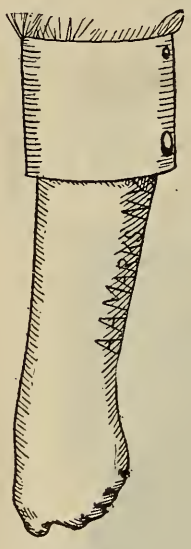
No. 1006.

No. 1007.

this person was enabled to walk acceptably and labor and earn his own livelihood. Cut No. 1007 represents him as he appears in daily life.

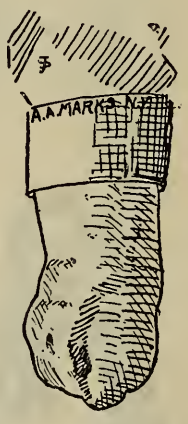
PARTIAL HAND AMPUTATIONS.

Amputations that have been made in the palms of the hands or through the fingers are capable of prothetic treatment, that not only restores natural appearances to the mutilated members, but enhances the utility of the remaining parts to a considerable degree. If a large part of the hand has been removed, the artificial part will prove of greater value than if but a small part is removed. If the fingers are amputated and the thumb remains, artificial fingers will provide a medium against which the thumb can be pressed, thus restoring in a measure the valuable grasping power of the hand. When only a part of a finger is amputated, it is not regarded as important that an arti-



No. 1008.

No. 1009.



No. 1010.

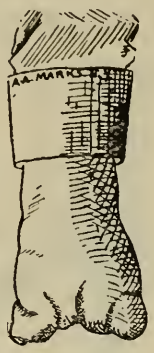
ficial part should be applied; it can be of but little service, aside from that of concealing the loss and giving the hand a natural appearance when covered by a glove. The exceptions are cases where the entirety of the fingers are necessary to perform the work in which the subject is engaged. For example, pianists, organists, and musical instrument players generally. We were called upon some years ago to furnish the half of the middle finger to a flute player. He found it necessary that the deficient member should be restored in its length, so that he might place that finger on the frets of his instrument. The finger was made accordingly and served satisfactorily. The stumps must be long and powerful in order to hold and control the attached parts firmly enough to meet the wants of professional persons.

Cut No. 1008 represents a hand that has been amputated at the bases of the fingers and thumb. But the stumps that were left were too short to be available in controlling individual fingers. Therefore, it was found necessary to attach a rubber hand similar in construction to that represented in Fig. No. 1047.

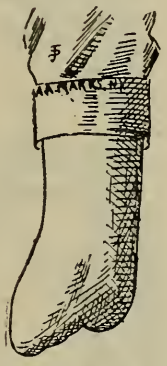
Cut No. 1009 represents a partial hand amputation. The fingers were removed at their bases, and the thumb removed below the first joint.

No. 1011.

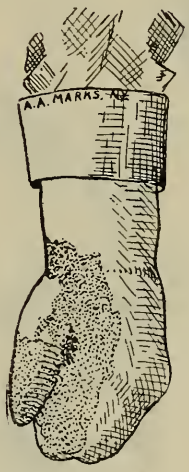
No. 1012.



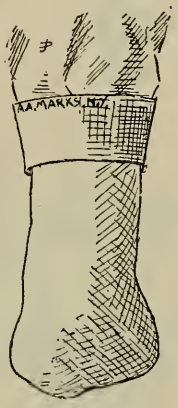
No. 1013.



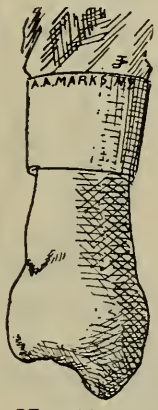
No. 1014.



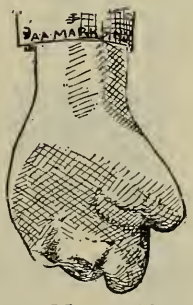
No. 1015.



No. 1016.



No. 1017.



No. 1018.

No. 1019.

Cut No. 1010 represents a stump with the fingers and thumb removed through the metacarpals.

Cut No. 1011 represents a partial hand amputation, and Cuts Nos. 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, and 1026 represent partial hand amputations, presenting many peculiarities. Some stumps have fingers remaining, others

have not. Style No. 1047 hand was applied to each and every one of these cases.

Cut No. 1027 represents a partial hand amputation. All the fingers were removed at their bases, the thumb remaining unimpaired.

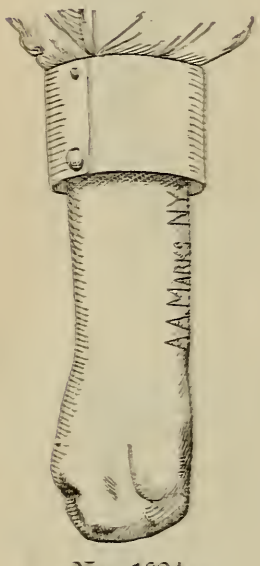
Cut No. 1028 represents a partial hand amputation, all of the fingers

No. 1020.

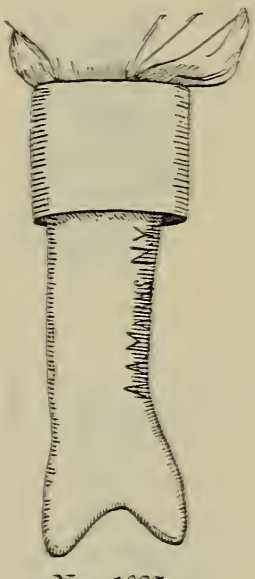
No. 1021.

No. 1022.

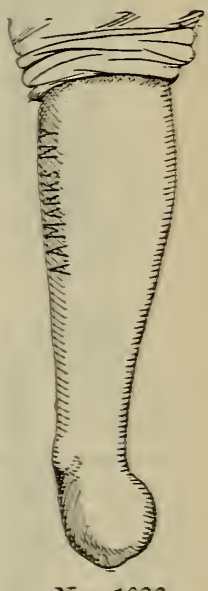
No. 1023.



No. 1024.



No. 1025.



No. 1026.

removed obliquely through the metacarpals, the thumb remaining unimpaired.

Cut No. 1029 represents a partial hand amputation, all the fingers removed and most of the metacarpals; the thumb remained, but on account of the destruction of the adductor muscles the thumb became abducted and required support.

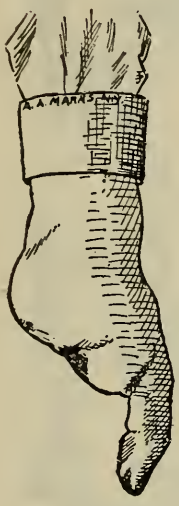
Cuts No. 1030, 1031, 1032, and 1033 represent partial hand amputations, the fingers removed obliquely through the metacarpals, thumbs remaining.

Cut No. 1034 represents a partial hand amputation; the fingers removed at their bases, and the thumb partly removed at the base of the nail.

No. 1027.

No. 1028.

No. 1029.



No. 1030.

No. 1031.

No. 1032.

No. 1033.

No. 1034.

No. 1035.

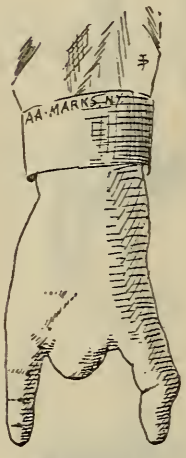
Cut No. 1035 represents a partial hand amputation; the fingers removed and part of the palm. All of the above hands were supplied with artificial parts constructed upon the plan of No. 1048.

Cut No. 1036 represents a partial hand amputation, the index and small fingers were removed a little below the second joints, the two middle fingers were removed at the bases. The artificial hand that was applied to this case was constructed upon the plan of No. 1048, with the index and small fingers made large at their bases and connected with the rest of the hand.

No. 1036.

No. 1037.

No. 1038.



No. 1039.

No. 1040.

No. 1041.

Cuts Nos. 1037 and 1038 represent the amputations of the index fingers near their bases. Artificial fingers constructed on the plan of No. 1050 were applied.

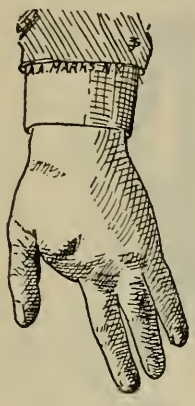
Cut No. 1039 represents an amputation of the index, middle, and ring fingers; the thumb and small finger were injured and became motionless. A hand constructed on the plan of No. 1052 was applied to this case.

Cut No. 1040 represents the amputation of the thumb and three fingers, the small finger remaining unimpaired. An artificial hand, constructed somewhat on the plan of No. 1051, with rubber thumb attached, was applied to this case.

Cut No. 1041 represents a similar case and treated the same.

Cut No. 1042 represents an amputation of the index finger through the first phalanx. A finger constructed on the plan of No. 1050, with a leather socket extending well down on the hand, was applied.

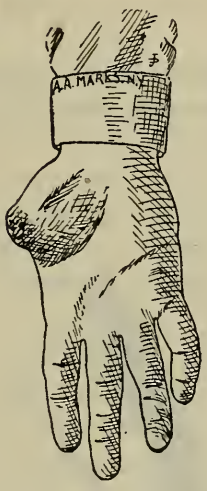
Cut No. 1043 represents a mutilated hand; the thumb crooked and more or less impaired, the index finger removed at the first joint, the



No. 1042.

No. 1043.

No. 1044.



No. 1045.

No. 1046.

rest of the fingers removed, together with a part of the palm. A suitable hand was made and applied.

Cut No. 1044 represents a hand mutilation; the thumb abbreviated, index finger injured so that it became flexed and rigid at the first joint. Artificial hand suitable for the case was made and applied.

Cuts Nos. 1045 and 1046 represent the amputations of thumbs.

Cut No. 1049 represents a style of thumb made and applied to each case.

Cut No. 1047 represents a rubber hand, modeled to fit the stump and to match as near as possible the remaining hand. It is composed of rubber, with ductile or rigid fingers, as may be chosen. It is provided with a lacing running down the palmar line. The stump is inserted in the hand, and laced about the wrist.

Cut No. 1048 represents a hand similar to No. 1047, but provided with an aperture through which the remaining thumb is allowed to pass. In other respects it is constructed and attached to the hand in the same manner as No. 1047.

Cut No. 1049 represents an artificial thumb, made of either rubber or

No. 1047.

No. 1048.

aluminum. It is of convenient shape to slip over the stump or attach to the hand.

Cut No. 1050 represents an artificial finger made of rubber or aluminum, as may be chosen. It is hollow, so as to slip upon the stump, or

No. 1049.

No. 1050.

is made with continuous base, so as to pass upon the back and front of the hand, and lace in place.

Cut No. 1051 represents a rubber hand, calculated to be placed upon a hand from which the index and small fingers have been removed.

Cut No. 1052 represents a rubber hand to accommodate a case in which the index, middle, and ring fingers have been removed.

Cut No. 1053 represents a rubber hand to accommodate an amputation of the index and ring fingers. These hands are made in the same manner as No. 1047. The apertures are to permit the remaining fingers of the mutilated hand to pass through. Artificial hands and parts of hands are made of rubber or aluminum, as may be selected by the wearer. Rubber is generally preferred, as it is pliable, more comfortable to wear, and possesses a large range of usefulness. The fingers are

No. 1051.

No. 1052.

No. 1053.

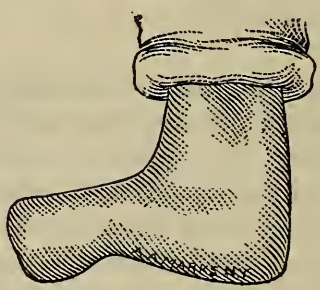
flexible, soft, ductile, or rigid, according to the wishes of the wearer. Aluminum is durable and light, and retains its shape a great length of time. The angles at which the fingers are placed are to be those that are the most accommodating for the wearers; they should be determined before the orders are placed.

As rubber or aluminum fingers have to be modeled to order and cast in molds especially prepared, they are expensive to produce. The making of model, mold, and one hand for any of the above hand amputations, will cost $50. If duplicates are wanted at any future time, they can be furnished at $20 each, provided the original model and mold require no change. The cost of a single finger or thumb, either rubber or aluminum, is $30. Duplicates can be had at $10 each, if original models are acceptable. Plaster casts of the mutilated member, as well as diagrams and measurements of the companion or sound hand, are required to fill each order.

DEFORMITIES, APPARATUS FOR RESECTIONS, ETC.

There is a class of deformities and resections of upper extremities that can be treated prothetically, as they require artificial parts the same as amputations. Hands and parts of hands are made to attach to the malformed members, so as to correct the deformities and supply the deficiencies so far as to make those members useful and ornamental. A number of deformed hands and arms have been illustrated and described in preceding pages.

No. 1054.



No. 1055.

Cut No. 1054 represents a deformity of forearm, the elbow joint possessing normal conditions, flexion, and extension full and powerful, the end of the stump terminating in a knob protruding from one side.

Cut No. 1055 represents a deformity of elbow joint and forearm. A very slight movement remained in the elbow, the forearm terminating in an enlargement. Both of these deformities were treated the same as wrist-joint amputations, and artificial arms were applied that encased the forearms and took support from the enlargements on the extremities. An artificial arm constructed on the plan of No. 991 was applied to each case, with gratifying results.

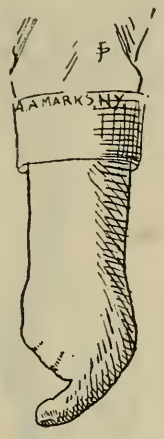
Cut No. 1056 represents a deformed hand, the metacarpal section greatly abbreviated and the fingers rudimentary, wrist mobility almost imperceptible. This case was treated the same as a hand amputation, and an artificial hand constructed upon the plan of No. 1047 was applied.

Cut No. 1057 represents a deformity of the hand. The metacarpals appear to be normal, all but one finger absent. The case was treated the same as an amputation, and a hand similar to No. 1047 was applied.

Cut No. 1058 represents a deformity of the hand, metacarpals very small, fingers rudimentary, one finger corresponding to a thumb remaining. The case was treated the same as a partial hand amputation, and a hand constructed on the plan of No. 1048 was applied.

Cut No. 1059 represents a deformity, the thumb and small finger

No. 1056.



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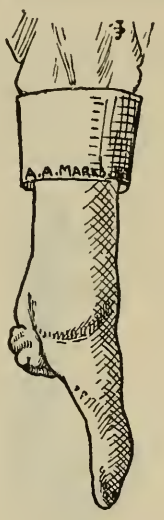
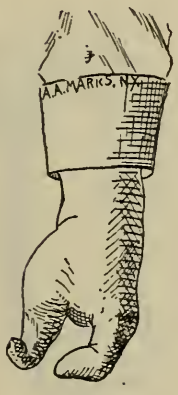
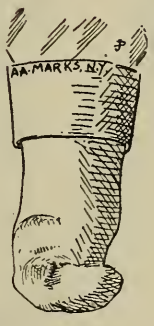


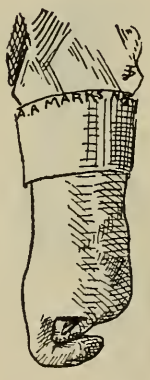
No. 1058.



No. 1059.



No. 1060.



No. 1061.

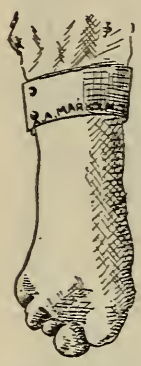
present, but greatly distorted and valueless. A hand constructed on the plan of No. 1047 was applied.

Cut No. 1060 represents a deformity, the hand rudimentary, and the fingers webbed and nearly closed, wrist without motion. The case was treated the same as an amputation, and a hand constructed upon the plan of No. 1047 was applied.

Cut No. 1061 represents a hand deformity, metacarpals undeveloped, with rudimentary fingers, which were contracted and valueless, the wrist normal. The case was regarded the same as an amputation, and a hand constructed upon the plan of No. 1047 was applied.

Cut No. 1062 represents a hand deformity, metacarpals perfect, and fingers rudimentary. A rubber hand constructed upon the plan of No. 1047 was applied successfully.

Cut No. 1063 represents a deformity, metacarpals imperfect, thumb and index finger partially developed, other fingers rudimentary. A rubber hand was modeled for this case, with thumb detached from the hand and made to slip on the stump separately from the fingers. The



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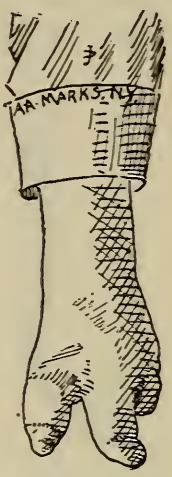
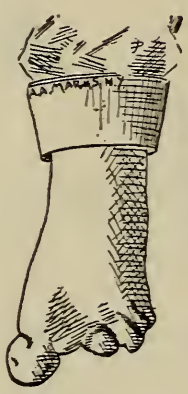


No. 1063.

No. 1064.

No. 1065.



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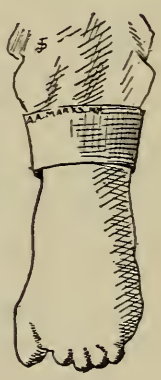


No. 1067.

No. 1068.

fingers were combined with one socket which encased the metacarpal region.

Cut No. 1064 represents a hand deformity, the thumb and three fingers absent, the little finger present, which possessed insufficient strength to be available; it was pressed against the hand, and treated as an amputation. No. 1047 rubber hand was applied.

Cut No. 1065 represents a deformity, the hand terminating with thumb possessing normal conditions. An artificial hand was modeled and applied to this case; it supplied the missing fingers and permitted the natural thumb to protrude from the socket.

Cut No. 1066 represents a deformity of the hand, thumb and fingers undeveloped. The artificial part supplied, consisted of three fingers to take the place of those that were absent, and a thumb that was attached independently.

Cut No. 1067 represents a malformation, fingers and thumb rudimentary. An artificial hand with a full complement of fingers was made that encased the entire hand, which restored a natural appearance to the deformed member.

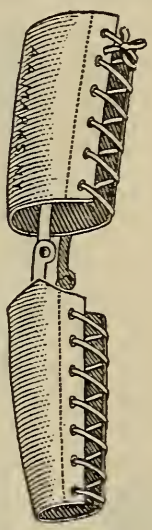
Cut No. 1068 represents a deformed hand, the fingers and thumb rudimentary. The case was regarded the same as an amputation, and a hand constructed with thumb and fingers modeled to as near the natural lines as possible, with index and middle fingers webbed at their bases, was applied.

APPARATUSES.

In cases of ununited fractures of the humerus or of the ulna and radius, apparatuses must be applied that will hold the ununited bones in their proper positions, and at the same time give the arm sufficient rigidity to enable the hand to lift and carry articles and perform labor.

Dislocated shoulder or elbow joints, and exsections of elbow joints, must be treated in a similar manner.

Cut No. 1069 represents an apparatus for ununited fractures of either humerus or radius and ulna; the forearm and muscle parts are con-



No. 1069.

No. 1070.

structed of materials sufficiently rigid to serve the purpose. They are connected by articulating joints that work in harmony with the elbow, the parts being laced sufficiently firm to hold the bones in place and give the arm strength and firmness.

Cut No. 1070 represents an apparatus for exsection of the elbow joint, or for the proper support of a weakened shoulder joint. The

No. 1071.

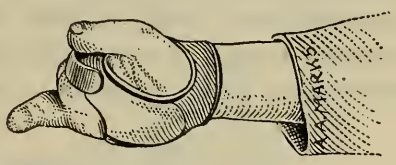
forearm and muscle parts are made of suitable material and are connected by joints that work in harmony with the elbow. The muscle part is terminated by a hood fitted to the shoulder, and made to rest comfortably upon it. When necessary, a strap connected with the hood is passed around the body, which holds the appliance firmly in place.

Cut No. 1071 represents a partial hand amputation. The subject was

a sailor, and desired an appliance that would enable him to hold a rope or carry articles of considerable weight.

Cut No. 1072 represents a socket and hook made to accommodate his wants; the socket was made of leather, formed to fit his mutilated hand, with apertures to admit the passage of the little finger and the remaining part of the thumb. Between the two apertures a strong

No. 1072.



No. 1073.

hook of flattened steel was secured. With this appliance attached as shown in Cut No. 1073, the usefulness of the mutilated hand was greatly enhanced.

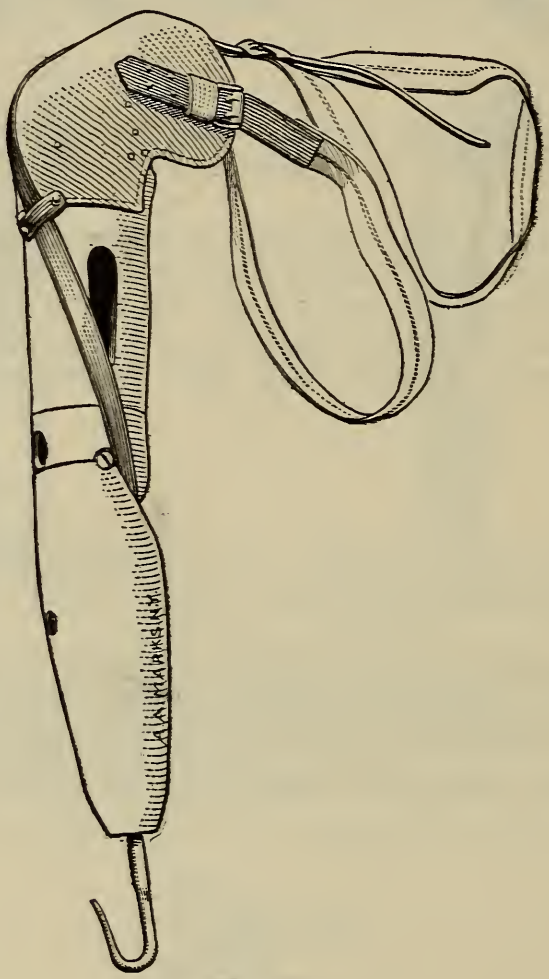
Our experience in devising appliances for deformed, mutilated, distorted, and injured hands, has been extensive, and we feel competent to do much for those who are in need. We will at any time gladly counsel any person thus afflicted, and will always give advice without charge, and will construct the most useful appliances at moderate charges.

RUBBER HANDS APPLIED TO ARTIFICIAL ARMS OF OTHER CONSTRUCTION THAN OUR OWN.

We have devised methods by which we can attach rubber hands to artificial arms no matter upon what plans they may have been constructed. We charge $20 for each hand; this includes a full line of implements, namely, hook, knife, fork, brush, and a pair of kid gloves.

PEG ARMS.

There are artificial arm-wearers who do not care to combine the ornamental with the useful; they are willing to sacrifice every embellishment in order to curtail expense. They are willing to use a hook attached to the arm, and dispense with the hand. The demands upon their resources are already so great that they find it necessary to sacrifice ornament from the standpoint of economy. Peg arms are made to accommodate those persons. An arm for an amputation at the



No. 1074.

shoulder or above the elbow, can be essentially the same in construction as No. 930 or No. 942, but by being constructed with elbow joint and without a hand, its cost will be but little less than one with a rubber hand.

Cut No. 1074 represents an arm for an amputation above the elbow. It is provided with elbow motion, elbow lock, wrist plate, but no hand. A hook is slipped in the extremity, which enables the wearer to carry articles and perform a variety of work. The price of this arm, with a full complement of implements (except hand) is $65.

Cut No. 1075 represents an arm for an amputation above the elbow, constructed of wood, without elbow motion, and terminating in a hook. It is made in a partly flexed position at elbow for convenience, but can be made straight or curved to any angle that may be desired. For a laboring man the angle shown in the cut is considered the most accommodating. It is held firmly to the stump by means of a shoulder strap. This arm is very useful for a laboring man who has a very short stump, and will enable him to carry articles, lift, pull, and pry.

No. 1075.

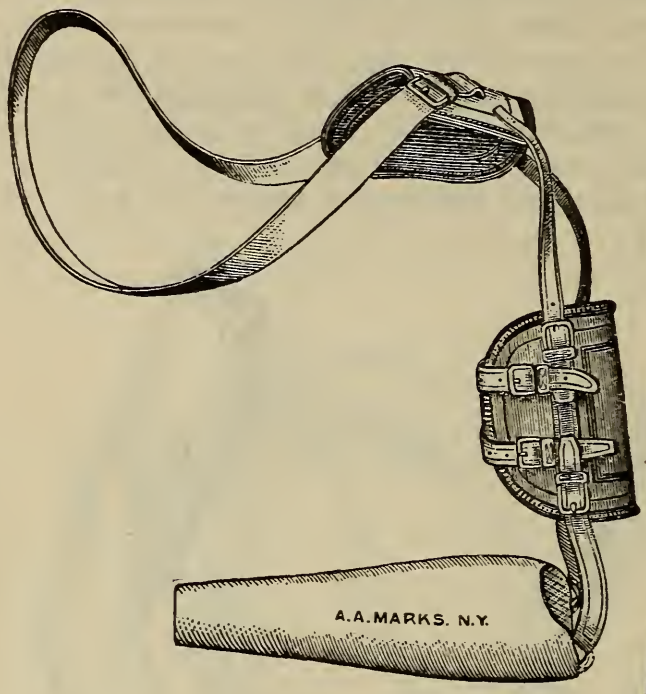
No. 1076.

Cost from $30 to $40, according to finish. A full set of implements, namely, hook, knife, fork, and brush, is included in the above price.

Cut No. 1076 represents a peg arm for elbow-joint amputation. There is no motion at the elbow, no hand at the wrist. The arm is partly flexed at the elbow, as shown in cut. The stump is received from the front and laced securely in place. Price $30 to $40, according to finish.

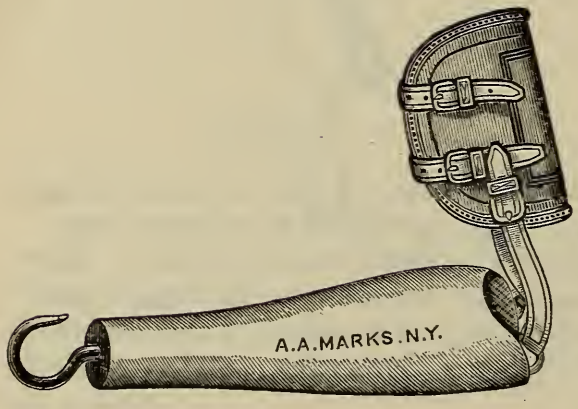
Cut No. 1077 represents an arm for an amputation below the elbow. It is constructed essentially the same as style No. 954—without a hand. Cut No. 1078 represents same with hook placed in forearm; knife, fork, or brush can in the same manner be placed in the end. Price $40, with a full line of implements.

Cut No. 1079 represents an arm for an amputation below the elbow, without attachments above elbow. The arm may be constructed of



No. 1077.

No. 1079.

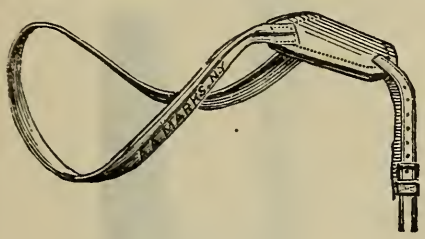


No. 1078.

wood, leather, or aluminum. Price $25 or $30, according to finish, with a full supply of implements, and also with suspender or upper-arm strap, as may be selected.

SUSPENDERS FOR ARTIFICIAL ARMS.

Cut No. 1080 represents a suspender for artificial arm, usually for amputation below the elbow. It consists of a shoulder plate, which is made of leather, calculated to cover the shoulder from the base of the neck to nearly the point of the shoulder. A webbing strap is attached at one end to the back of the shoulder plate, and the other is buckled to the front; this strap passes around the body, under the opposite arm. Leather straps are attached to the lower edge, both



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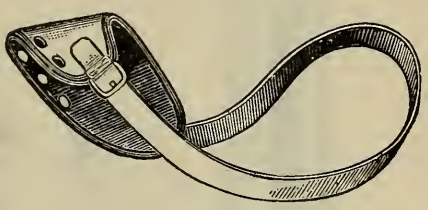


No. 1081.

front and back, which are connected with the upper part of the artificial arm. Price, each, $2.

Cut No. 1081 represents a suspender for an artificial arm for amputation above the elbow. The plate consists of a piece of strong leather, formed to fit the shoulder, one edge is brought close to the base of the neck, and the other above and near to the point of the shoulder. A webbing strap attached to the back of this plate passes around the body under the opposite arm, connecting with the front of the shoulder plate and adjusted by a buckle. The lower edge of the shoulder plate is provided with a row of eyelet holes for lacing, by which the upper part of the artificial arm is secured. Price, each, $2.

IMPLEMENTS.

Implements for artificial arms are of an endless variety, hooks, knives, forks, brushes, clevises, claw-hooks, pinchers, clamps, and rings. These are but few of the many devices that have been made for persons whose occupations demand something aside from the usual line. Each arm is supplied with a hook, knife, fork, and brush. These are included in the costs, and are always furnished. When additional implements are desired, they are furnished at the prices named below, and if a customer desires an implement made to order

No. 1082.

No. 1083.

No. 1084.

for any special purpose, we will gladly make it for him. Our charges for the same will be moderate.

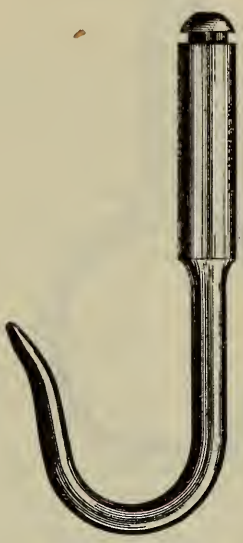
Cut No. 1082 represents a knife calculated to be carried in the palm of the hand or in the end of the forearm. The blade is made of steel, the handle of hard rubber. The cut represents it one-half its length. Price, each, 50 cents.

Cut No. 1083 represents a fork calculated to be carried in the palm

of the hand or in the end of the forearm. The illustration is one-half size. Price, each, 50 cents.

Cut No. 1084 represents a brush calculated to be carried in the palm of the hand or in the end of the forearm. This brush is a great assist-

No. 1085.



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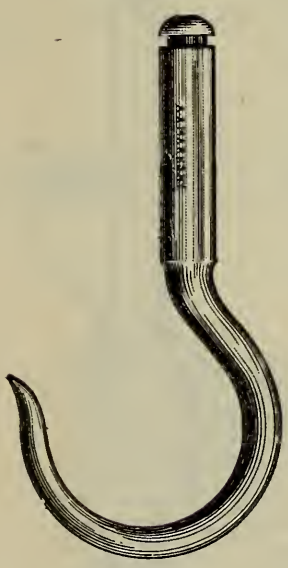

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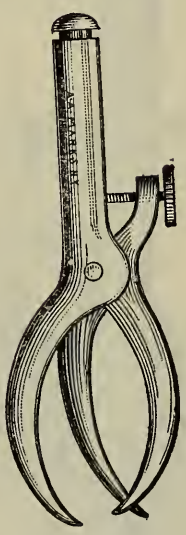


No. 1088.

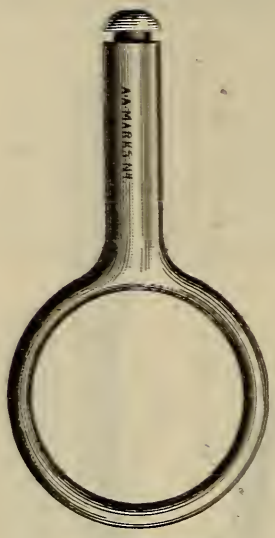
ance in washing the opposite hand. The illustration is one-half size. Price, each, $1.

Cuts Nos. 1085 and 1086 represent hooks calculated to be carried in the palm of the hand or in the end of the forearm. They are made with straight backs, so that they can be received in the palm of the hand; made in two sizes. The illustrations are one-half size. Price, each, $1.

Cut No. 1087 represents a round hook, calculated to be used in the end of the forearm. The curved back prevents the hook from being

placed in the palm of the hand. The illustration is one-half size. Price, each, $1.

Cut No. 1088 represents a claw hook, calculated to be worn in the



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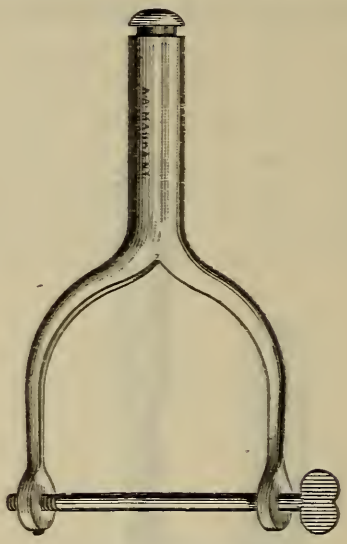

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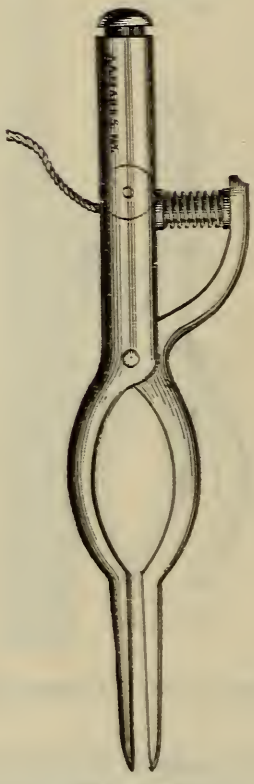

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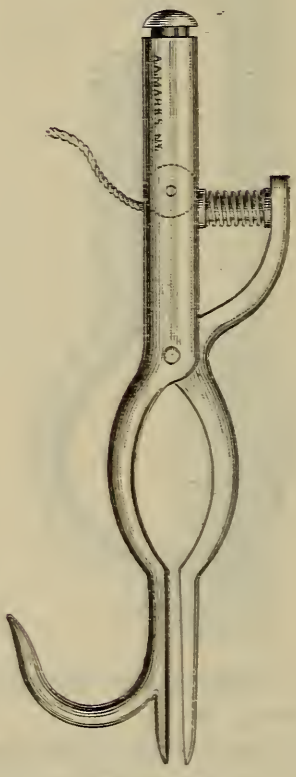


No. 1092.

end of the forearm. One part is made with two prongs, and the other with one; it is capable of being opened, closed, and set. This device enables a mechanic to clasp a tool with great firmness. The illustration is one-half size. Price, each, $5.

Cut No. 1089 represents a ring capable of being used in the end of the forearm. It can be immovably attached to the spindle, or allowed to swivel. The ring is serviceable for mechanics and farmers. Through it, the handle of a tool or farming implement can slide while the tool is held firmly and directed by the opposite hand. Illustration is one-half size. Price, each, $2.

Cut No. 1090 represents a clevis, calculated to be used for holding shop or farming implements. A quarter inch hole must first be driven through the handle at the proper place, then the pivot pin unscrewed from the clevis, the clevis must then be placed over the handle, and the pivot pin passed through one fork of the clevis through the hole in the handle and screwed into the other fork. This will hold the tool in an accommodating way and permit it to swivel. Illustration is one-half size. Price, each, $3.

Cut No. No. 1091 represents pinchers calculated to be used in the end of a forearm. The jaws can be opened and closed by means of a string connected with the shoulder. When the arm is extended, the contracting cord will act on the handle of the pinchers and cause the jaws to open. When the arm is bent the force on the contracting cord is released, the spring under the pinchers' handles acts, and the jaws are forced to close and hold whatever may be placed between them. Illustration is one-half size. Price, each, $8.

Cut No. 1092 represents a combination pinchers and hook. Price, each, $9.

UTILITY.

The services capable of being performed by artificial arms, especially when applied to forearm stumps, are almost limitless. Ambition and

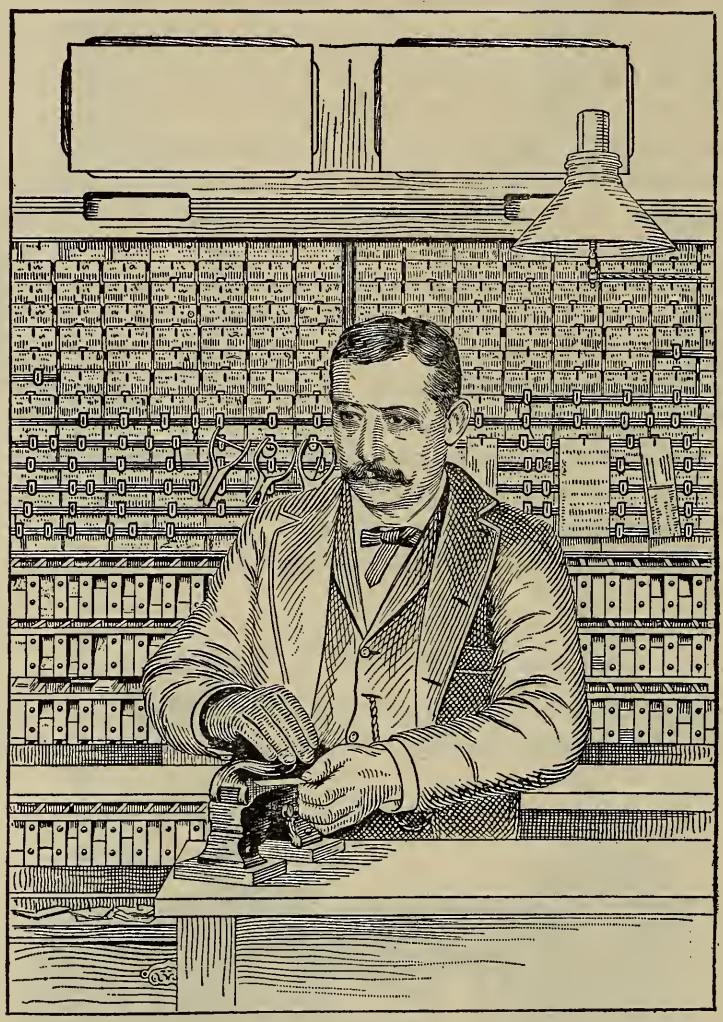
No. 1093.

practice extend the scope of usefulness. We have a young lady patron, an amanuensis, who uses her rubber hand for holding and guiding a

pen while writing. She has acquired the ability of writing quickly and legibly, and wields the pen with more dexterity than many writers who have natural hands.

Cut No. 1093 represents this young lady at her desk.

We have a customer who wears one of our artificial arms. He is



No. 1094.

engaged in a ticket office, where he sells many railroad tickets during the day. He works the dater with his rubber hand, and is considered as competent for his position as anyone in possession of natural hands.

Cut No. 1094 represents Mr. Woolley of Wellesville, O., stamping tickets.

Cut No. 1095 represents a customer of ours who is a railroad conductor. He passes through the train, collects tickets, holds them by the fingers of the rubber hand, and punches them in the usual way.

Cut No. 1096 represents a telegraph operator who writes messages with his rubber hand, while his natural hand is on the key.

No. 1095.

Cut No. 1097 represents one of our customers who wears an artificial left arm, and attends to the work of firing a stationary boiler. He has followed this line of labor for many years.

No. 1096.

No. 1097.

Cut No. 1098 represents a physician whose right arm is artificial. He drives his own horse, and holds the reins in his rubber hand.

No. 1098.

Cut No. 1099 represents a patron whose left arm is artificial, and who rows a boat with his rubber hand. His occupation requires him to be in a boat a great part of the time.

No. 1099.

Cut No. 1100 represents a farmer, whose right arm is artificial. He is able to plow, hoe, and perform almost any kind of farming work.

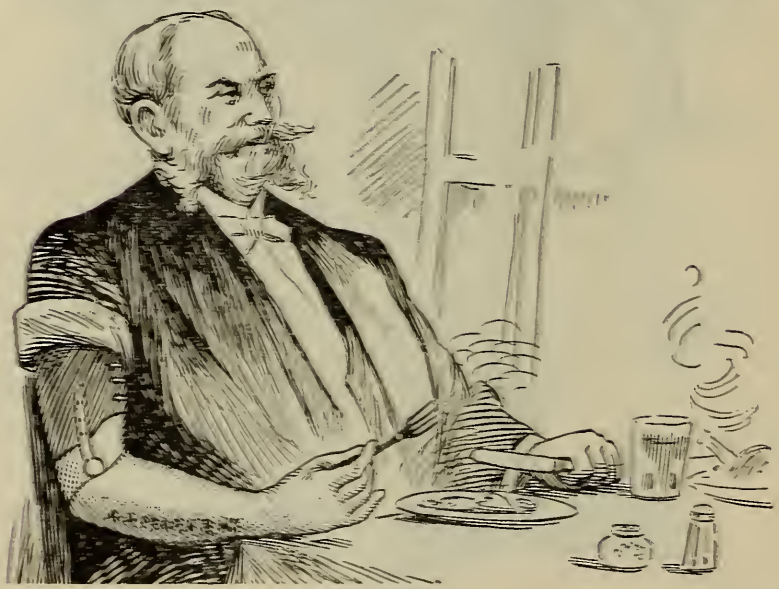
No. 1100.

Cut No. 1101 represents a traveling gentleman, who finds an artificial right arm of great service to him in carrying his valise. He has

No. 1101.

the hand made so that it is nearly closed and kept in that position rigidly.

Cut No. 1102 represents a patron who uses an artificial arm in a



No. 1102.

very dexterous manner. He inserts a fork in the hand. He is a "diner out," and always uses his artificial hand in managing the fork.

No. 1103.

Cut No. 1103 represents Mr. W. G. Bray of Dunklin County, Mo. His left arm is amputated above the elbow; he has worn an artificial arm for many years. He is clerking in a store and has to handle all kinds of heavy merchandise. He wheels a barrow without difficulty.

No. 1104.

Cut No. 1104 represents Mr. Ely of Windham County, Conn., who writes that he has no difficulty in working with other laborers and earning laborers' wages, although he has to do a great amount of work with the pickax. His right arm is artificial.

DIRECTIONS FOR TAKING MEASUREMENTS FOR ONE, OR A PAIR OF ARTIFICIAL ARMS.

Place a sheet of paper (about twenty by thirty inches) on a smooth table, remove all clothing from the upper part of the body, place both arm and stump on this paper at full length. Be sure that the edge of the paper presses closely against the chest. Pass a long pencil down

No. 1105.

No. 1106.

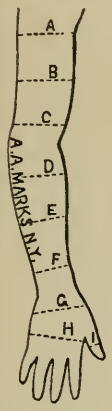
the inside of the arm, as represented in Cut No. 1105, around the fingers and up the outside to the shoulder. Then pass the pencil around the amputated side from body around end of stump, and up to the shoulder, as represented in Cut No. 1106. Bend the elbow of the

No. 1107.

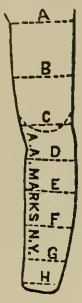
No. 1108.

sound arm to about right angles, mark around it from shoulder, around elbow, down the forearm around the hand, up the inside to the shoulder, as represented in Cut No. 1107. Bend the elbow of the amputated arm to right angles, and mark around it from shoulder around elbow, around end of stump, up the inside to the body, as represented in Cut No. 1108. If these diagrams are correctly taken, they will resemble Figs. 1109, 1110, 1111, and 1112.

With a tape line measure the distance from the point of shoulder to the point of elbow of sound arm, also the distance from the arm-pit to the bend of elbow. Measure the distance from the point of shoulder to the point of elbow of the amputated arm, also the distance from the armpit to the bend of the elbow. Give the circumference of each arm at intervals of two inches, beginning close to the body. These circumferences are represented by dotted lines A, B, C, D, E, and F, of sound arm, see Cut No. 1109, and the dotted lines A, B, C, D, E, F, G, and H, in diagram of stump. See Cut No. 1110. Then give the circumference of the hand at the base of the thumb, represented by dotted



No. 1109.



No. 1110.

No. 1111.

No. 1112.

line G, then the circumference of the palm, at the base of the fingers, represented by dotted line H; then give the circumference of the thumb at the first joint represented by dotted line I. Cut No. 1109.

If one arm is amputated in or above the elbow, the diagrams and measurements of the sound arm called for in Cuts Nos. 1105, 1107, and 1109 are required, and only one diagram of stump, together with circumferences at intervals of two inches; the distance from point of the shoulder to point of the stump, and the distance from the armpit to the point of the stump are also required.

If both arms are amputated above the elbows, diagrams of each stump, and the distance from the point of each shoulder to the point of each stump, and from each armpit to the point of each stump; also the circumferences of each taken at intervals of two inches.

If both arms are amputated below the elbows, the diagrams and measurements may be taken as suggested by Cuts No. 1106, 1108, 1110, and 1112.

All amputations in the shoulders, elbows, or wrists, or in the hands, leave extremities that are bony, more or less sensitive, and requiring very exact fitting. Such stumps should be reproduced in plaster.

Answers to the following questions should be attached to the blank and forwarded with every order: Name of patient? Post-office address? Occupation? Age? Weight? Cause of amputation? When was amputation performed? Which arm amputated? Has the patient worn an artificial arm? If so, whose make? Name of the party ordering? His address? Is the arm to be made and fitted from measurements in the absence of the wearer? To what address shall it be shipped?

PART III.

GENERAL INFORMATION.

INSTRUCTIONS FOR TAKING PLASTER CASTS OF STUMPS.

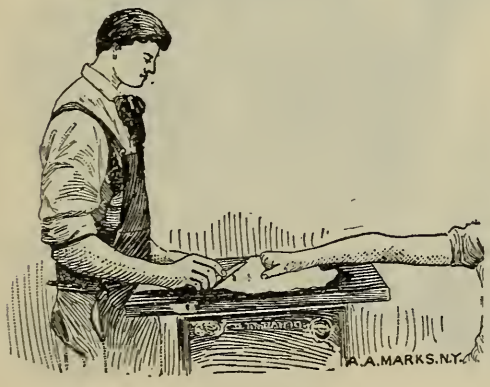
Plaster casts are only required of stumps or deformed limbs on which there are prominences or irregularities that cannot be located by descriptions or diagrams. Amputations in the hip, knee, ankle, foot, shoulder, elbow, wrist, and hand, usually leave stumps that should be reproduced in plaster. Casts of such stumps are valuable helps in making fittings in the absence of the wearers. If the wearer intends to be fitted in person, it will not be necessary for him to send a cast, no matter what character of a stump he may have. Several methods for taking casts will be explained, and the one most suitable for the case can be selected. As there is some difficulty in mixing, spreading, and judging plaster, it is always better to engage some person familiar with the work. A dentist, a wax flower-worker, or a maker of plaster statuettes should be employed if available. For the guidance of those who desire to make their own casts, we will submit the following methods.

THE SIMPLE METHOD.

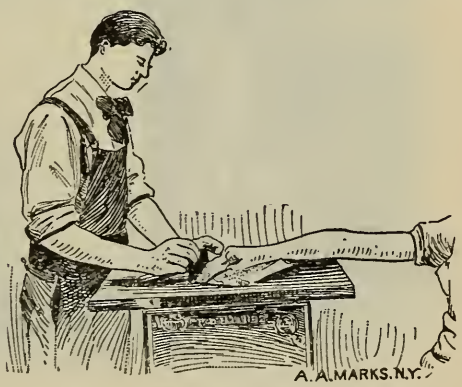
The stump of which the cast is to be made, should be divested of all clothing, and the hair and fuzz shaved off. Two quarts of plaster of Paris should be placed in a basin containing about one quart of water. The plaster should be mixed thoroughly, and then spread by a knife upon the stump. There should be at least one-half inch in thickness over the entire stump. Keep the stump quiet until the plaster has become hard. This should not take more than ten minutes. Then remove the cast, the inside of which will be a counterpart of the stump.

DIVISION METHOD.

If the stump is larger at the end than immediately above, the cast will have to be taken in two parts, otherwise it will not be possible to



No. 1113.



No. 1114.

draw the stump from the mold. The cast can be taken in two parts in two ways: First, by spreading a quantity of the mixed plaster on

a board, then resting the stump on it. Pile up the plaster on the sides of the stump until it has reached the greatest diameter (see Cut No. 1113), then lay pieces of thin wet paper on all the exposed surfaces of the plaster (see Cut No. 1114), then pour and spread plaster on top of

No. 1115.

No. 1116.

the stump (see Cut No. 1115), let it run down the sides and on top of the paper. The plaster should be not less than half an inch thick. When it has become thoroughly hard, it will, by a little force, separate at the division line made by the paper, and the stump can be withdrawn. (See Cut No. 1116.)

STRING METHOD.

The "string method" is described and illustrated as follows: A strong, thin cord is passed down each side of the stump around the

No. 1117.

No. 1118.

end, and held by the subject, as represented in Fig. 1117. The string must not be pulled very tightly. Spread a little plaster on the string,

so as to make it adhere to the stump, as represented in Cut 1118. Work quickly and spread the plaster all over the stump, back, front, and sides, until there is a thickness of not less than half an inch on all the surfaces. Be sure and carry the plaster well up to the joint. As

No. 1119.

soon as it begins to harden, both ends of the string should be pulled downwardly (as represented in Cut No. 1119) as far as the end of the stump. This will cut the plaster mold into two longitudinal parts. As soon as the plaster has become hard, a knife or chisel can

No. 1120.

No. 1121.

be inserted in the crease cut by the string, and by a little prying motion the mold will separate and can be removed from the stump, as represented in Cut 1120. The two parts should be thoroughly oiled on the

insides, then put together; a strong cord should be passed around them, and a little plaster spread down each side and around the bottom so as to seal the seam. After this is done, enough plaster should be mixed to fill the mold. It should be thinner than before, and poured into the mold very slowly. See Cut No. 1121. After the mold has been filled it should be laid aside for two or three hours. The shell can then be broken off, and the cast obtained will be a fac-simile of the stump. This method is especially adapted to knee-joint, ankle-joint, foot, elbow-joint, wrist-joint, and part of hand amputations.

PLASTER BANDAGE METHOD.

An excellent method for taking a plaster cast of a flabby stump, or a stump that has to be compressed in order to obtain tight fittings, is known as the "plaster bandage method," explained as follows:

No. 1122.

Take five or six strips of cheese cloth or crinoline, or any other thin and open cloth, two inches wide and about twelve feet long, spread dry plaster on each, as shown in cut No. 1122; put only enough on to fill the meshes. Each strip should be rolled up snugly and separately. The stump should be made bare, and all the hair removed by shaving,

No. 1123.

or it should be made to lay down by thick soap. One plaster bandage roll should be immersed in water (see cut No. 1123), and kept there until bubbles cease to come to the surface. When well soaked it should be wound around the stump very tightly. Begin at the end and wind upwardly. See that every layer laps the edge of the preceding layer,

and continue upward to the joint. Then work downwardly and around the end of the stump in several directions, then up again, and so on until every part of the stump up to the joint has been covered by about four layers. See cut No. 1124. For a long and large stump it will require at least five bandages of the width and length above noted.

No. 1124.

A small stump will, of course, require less. The bandages should be allowed to remain on the stump until they have become hard. This may take one or two hours, and possibly three, as the cloth holds the moisture a great length of time. Therefore, the plaster will not harden so quickly as it will in any of the methods previously described.

No. 1125.

As soon as it has become thoroughly hard, it should be drawn off the stump. See cut No. 1125. If it will not slip off easily cut through one of the sides so as to allow it to open and permit the obstructing part of the stump to pass. This bandage mold should be filled with sawdust, packed well, and sent to us; or if preferred, a cast can be made from the mold, as follows: Grease or oil the inside thoroughly, then fill it with thin plaster; as soon as it has become thoroughly hard, the plaster mold can be torn off and a facsimile of the stump will be obtained.

In sending casts or molds, care should be taken to have them well packed in cotton, sawdust, excelsior, or hay, otherwise they will break in transportation.

ARTIFICIAL LIMBS MADE AND FITTED FROM MEASUREMENTS WITHOUT THE PRESENCE OF THE WEARERS.

The inventor of the rubber foot, Mr. A. A. Marks, has the credit of originating the scheme of fitting artificial legs and arms from measurements, without requiring the persons who are to wear them to leave their homes. During the early part of his experience as an artificial-limb manufacturer, he realized the importance of devising a scheme by which a person living in the most distant part of the land could, by the assistance of some member of his family, take his own measurements and diagrams and send them to the manufactory and have an artificial limb constructed by them, with the assurance that it would fit his stump perfectly. The value of this scheme could not be overlooked, as it could not be expected that persons living in foreign countries, or in our own distant States and Territories, would submit to the expense or fatigue of a wearisome journey in order to get an artificial limb. Such journeys not only incur expense, but a great sacrifice of time, and when considered by a timid or a frugally disposed person, the alternative is more likely to be decided upon, that of accepting a makeshift that may be procured near at home, and foregoing the benefits of a modern limb made by a skillful manufacturer. And if a makeshift cannot be procured, he will resign himself to crutches for the remainder of his life.

Mr. Marks promptly set himself about to solve this problem. He collected all the data he had accumulated, made himself thoroughly acquainted with the anatomy of the extremities, and established the system that has been in operation for over thirty years. Many thousand artificial limbs have been made and fitted under that system; the results have been most satisfactory. Expressions of gratitude have come from all parts of the world commendatory of the system that opened up so many advantages to so many persons. European Princes, Oriental dignitaries, South American Generals, and thousands in affluent circumstances have shared the benefits equally with those who were so indigent that the expense of procuring an artificial limb alone would debar them of any other outlay.

The system has put the artificial-limb maker in touch with the artificial-limb wearer, no matter where he may be located or in what circumstances he may be situated.

Our artificial limbs have been exported to every country on the face of the earth, and fully ninety per cent. have been manufactured from measurements without the presence of the wearers, and it is a very rare exception that the fittings are ever subject to criticism.

We have patrons who live within a very few miles of New York

city, who are actively engaged in business, and who prefer to have their limbs fitted from measurements under the guarantees that we give, rather than absent themselves from their homes.

We encourage persons who reside at a great distance to have their limbs fitted from measurements, and, in order to relieve them of financial loss, we always assume the risks, by agreeing to make no charge for any reconstructions, refittings, or alterations, whether they are necessary on account of errors in measurements or peculiarities in the stumps.

Instructions for taking measurements and diagrams are given so explicitly in this book that a person can hardly err in taking them. When they are received by us they are subjected to the closest scrutiny, and if errors and omissions have been made they are sure of being detected, and corrections are immediately called for. As soon as the data is accepted we assume the risks and construct the required limb and send it to the wearer with full instructions for its application. If it fails to fit satisfactorily, the wearer is to communicate with us immediately, prompt advice will be given, and in all probability no further trouble will follow.

Should the most improbable condition arise, and it is found that the stump possesses some peculiarity which requires another or a personal fitting, the wearer will be apprised of that fact and be requested to return the limb for such alterations as may be deemed necessary, or to come in person, it being understood that no charge will be made for refittings or reconstructions.

We do not see how any stronger safeguard can be established that will protect the purchaser.

WHERE WE ARE LOCATED.

If, after all the facts presented in the preceding article are fully considered, the reader concludes that it is wise and prudent for him to come to us and be fitted personally, he will find himself welcome to our establishment, where he will be attended to promptly on his arrival, and will not be required to remain longer than is absolutely necessary.

We are located centrally, and are easily accessible from any of the railroad or steamboat landings. We will meet any person at the station on his arrival, if he will let us know, a day or two in advance, the time, day, and train on which he will arrive in New York, and the landing or station where he desires to be met.

In the event of arriving here unattended and not acquainted with the city, the following suggestions may be of value:

If the arrival occurs between the hours of seven in the morning and five in the afternoon, take any cross-town car at the station, ferry, or pier, go to Broadway and transfer to a Broadway car, ask the conductor to inform you when he reaches Fourth Street. We are located on the west side of Broadway, one door north of Fourth Street.

If the arrival occurs after five o'clock in the afternoon, it will be better to go directly to a hotel and remain there until morning. The Broadway Central Hotel is located at No. 671 Broadway, which is within two and a half blocks of our establishment. Accommodations can be had at that hotel at reasonable rates. The St. Nicholas Hotel is located at No. 4 Washington Place. This is within one block of our establishment. The rates are moderate.

New York city is complete with cable, electric, elevated, and horse-cars, and a person can get from one place to another very conveniently without walking any great distance.

Our establishment, located at 701 Broadway, is less than two miles from the Grand Central depot, where the New York Central & Hudson River Railroad, the New York & Harlem Railroad, and the New York, New Haven & Hartford Railroad terminate. It may be expected that anybody arriving from the New England States will be brought to this depot. We are a little less than three miles from the Forty-second Street ferry, which is the terminus of the West Shore Railway. We are less than one mile from Christopher Street ferry, which is the terminus of the Delaware, Lackawanna & Western Railroad, and the Morris & Essex Railroad. We are less than one mile from Chambers Street ferry, which is the terminus of the Erie Railway. We are less than a mile and a half from Desbrosses Street ferry, which is one of the termini of the Pennsylvania Railroad and the Lehigh Valley Railroad. We are a mile and a half from Liberty Street ferry, which is the terminus of the Central Railroad of New Jersey, Baltimore and Ohio Railroad, and the Philadelphia and Reading Railroad. We are two and a quarter miles from Thirty-fourth Street ferry, which is the terminus of all the Long Island railroads. We are two and a half miles from the Battery.

These distances are given for the information of persons who desire to engage hacks upon their arrival in New York. A one-horse hack cannot legally collect more than $1 for conveying one or two passengers a distance not exceeding two miles, and $1.50 for over two miles and not exceeding three. A two-horse carriage has the privilege of charging more.

It will thus be seen that $1 or $1.50 is the most that can be legally charged for conveying one or two persons from any railroad station or ferry to our place when a one-horse vehicle is engaged.

It is always best to make a bargain with the driver before entering his vehicle, and pay him the amount agreed upon as soon as he has brought you to our store.

No person should consider it necessary to be conveyed by a carriage. Surface cars can be boarded at any station. They are accommodating, and no matter how greatly a person may be crippled, he can reach us by street cars with little or no annoyance, and the expense will be no more than five or ten cents.

Policemen can always be found at stations, ferries, and piers. Their duties are not only to protect persons and property, but to give such directions and information as may be needed by strangers.

Boarding and lodging accommodations can be obtained at reasonable rates. Furnished rooms in private houses can be rented at from $2 to $5 per week, according to location. Good table-board can be had at from $3 to $5 per week. Hotel accommodations, including board and lodging, can be had at from $2 to $5 per day. By engaging a furnished room and eating in restaurants, living expenses in New York can be kept within very low figures.

Upon leaving home instructions should be given that letters and telegrams may be addressed to the care of A. A. Marks, 701 Broadway, New York. They will be promptly delivered to the parties to whom they are addressed, or held until called for.

Our patrons are welcome to the accommodations of a fire-proof safe, in which valuables and money can be deposited. They have the liberty of our premises while they tarry in New York, and if they are shopping they can have their goods delivered here. Or can make engagements and meet parties here, and have the exclusive use of private rooms for private interviews.

CALLS MADE TO RESIDENCE.

Persons within the limits of New York city, Brooklyn, or Jersey City will be called upon at their residence when requested. Consultation, measurements, and advice will be given free of charge. Persons living outside of those limits will be called upon by a competent person who will examine their stumps, give advice, take measurements, and attend to their needs, if traveling and hotel expenses and the extra time consumed in traveling are paid for.

LADY ATTENDANTS.

Ladies who prefer to be attended by one of their own sex will find ladies in our office who are competent to attend to their wants, take measurements, fit and adjust artificial limbs.

BRANCHES.

We have no branches. We are established in New York city, and in no other place. Our profession is analogous to that of a surgeon. Our skill and judgment, which are so frequently required, cannot be transmitted to a manager of a branch office. If we were to establish branches we would have to place them under the management of others, and thus would more or less jeopardize the welfare of our patrons. We have been forced to this conclusion by experiments that we have made. To take the place of branches our system of fitting from measurements has been devised, which has been found to be thoroughly satisfactory.

Physicians, druggists, truss, and instrument makers can be found in

almost every city and town, who will take measurements and attend to the details of ordering, if they are called upon.

If the reader desires to order a limb, and does not care to take the measurements himself, he can call on his physician or his druggist, or can go to a neighboring town where there is an instrument maker, and have his measurements taken, and the details of ordering attended to.

PRICES.

The prices for artificial legs and arms described in this book are given with each and every kind. They will be found among the descriptions. Briefly they are as follows :

LEGS.

Artificial legs for hip-joint amputations, with suspenders and all necessary attachments, each, ... $100

Artificial legs for thigh stumps, with necessary suspenders, each, 100

Artificial legs for knee-joint stumps, with necessary suspenders, each, ... 100

Artificial legs for knee-bearing stumps, with necessary suspenders, each, ... 100

Artificial legs for below-knee stumps, with necessary suspenders, each, ... 100

Artificial legs for ankle-joint and partial feet stumps, when knee and thigh supports are necessary, each, ... 100

Artificial legs for ankle-joints and partial feet stumps, when knee joints and thigh pieces are not required, each, ... 50

Artificial legs for below knee stumps, without knee-joints and thigh supports, with suspenders and thigh straps, each, . . . 65

Artificial feet for partial feet amputations, from . . $30 to $50

Apparatus for deformities, when knee joints and thigh supports are required, each, ... 100

Apparatus for deformities where knee joints and thigh supports are not required, each, ... 50

Extensions for shortened legs, when the legs from the knees down have to be encased, each, ... 50

Extensions for shortened legs, where ankle-joints only have to be supported, each, ... 30

Extensions for shortened legs that do not extend above the feet, each, ... 30

Peg legs for thigh amputations, provided with knee joints, including suspenders, each from $50 to $75, according to finish.

Peg legs for thigh stumps, without knee articulations, with necessary suspenders, each, $25 to $40, according to finish.

Peg legs for knee-bearing stumps, with knee articulations, with necessary suspenders, each, $50 to $75, according to finish.

Peg legs for knee-bearing stumps, without knee articulations, with necessary suspenders, each from $25 to $40, according to finish.

Peg legs for below knee stumps, with knee joints and thigh supports, each, from $30 to $50, according to finish.

Peg legs for below knee stumps, without knee joints or thigh supports, with thigh straps, each, $20 to $30, according to finish.

Peg legs for knee-bearing or below knee stumps, made to bear upon the flexed knees, style 819, each, ... $15

Suspenders of various kinds, consult pages 167 to 177.

Supplies for artificial legs, consult the last pages.

ARMS.

Artificial arms for amputations in the shoulders or above the elbows, with necessary suspenders, each, ... $75

Artificial arms for amputations in the elbows or immediately below, but too short to control the elbow movements, with necessary suspenders, each, ... 75

Artificial arms for stumps between the wrists and elbows, with steel side joints, each, ... 50

Artificial arms for stumps between the wrists and elbows, with duplex elbow joints, each, ... 50

Artificial arms for stumps between the wrists and elbows, with leather side joints, each, ... 50

Artificial arms for wrist-joint stumps, with elbow joints and upper-arm pieces, each, ... 50

Artificial arms for wrist stumps not requiring elbow joints or upper-arm pieces, each, ... 30

Artificial hands for partial hand amputations, each, . . . 50

Artificial hands or parts of hands for deformities, each, . . 50

Artificial fingers from $30 to $50 each.

Peg arms for shoulder and above elbow amputations, with elbow joints and necessary suspenders, each, ... 65

Peg arms for shoulder and above elbow amputations, without elbow joints, with necessary suspenders, each, ... 40

Peg arms for amputations in the elbows or immediately below, requiring elbow joints, with necessary suspenders, each, . 65

Peg arms for amputations in the elbows or immediately below, without elbow joints, with necessary suspenders, each, . . 40

Peg arms for amputations between the elbows and wrists, with steel duplex or leather elbow joints and necessary suspenders, each, ... 40

Peg arms for amputations between the elbows and wrists, without elbow joints, each, ... 35

Peg arms for wrist-joint amputations, each from $20 to $30.

Suspenders of various kinds, consult page 279.

Implements for artificial arms, consult pages 280 to 282.

ACCESSORIES.

Artificial legs are furnished with the following accessories without additional charge :

Legs for thigh and knee-bearing stumps. The necessary suspenders attached; one sock for each stump, screw-driver, box of grease, extra spring.

Legs for below knee stumps: Necessary suspenders attached, one long and one short stump sock; pocket oil can, screw driver, extra lacing.

Legs for ankle joint and partial feet stumps: Sock for stump, extra lacing, and necessary felt lining.

Artificial arms: Necessary suspenders attached, sock for stump, knife, fork, hook, brush, pair of kid gloves (except when arm is ordered without a hand).

Artificial legs and arms will be delivered to any person residing in the limits of New York City, Brooklyn, and Jersey City, or will be boxed and delivered to express office in New York City without additional charge.

TERMS OF PAYMENT.

Payment is required in advance with every order. If preferred one-half can be advanced with the order, and the balance paid on delivery. This is the plan on which payments are expected for *everything* that is made to order, from a suit of clothes to the building of a house, and it is considered to be in conformity with good business methods.

Every assurance is given that the interests and the welfare of the wearer will be subserved in every detail.

It is of the greatest importance to the manufacturer that his client shall be satisfied, not only with the fit and workmanship of his artificial limb, but that he shall become clever, skillful, and dexterous in its use, and thus reflect credit to the maker. The manufacturer cannot afford to neglect or hastily dismiss a case or show a lack of interest, or the least hesitancy in doing everything that is possible for the relief and comfort of his patron. No well-established house can afford to displease a customer or receive his ill will.

Wisdom and shrewdness compel the strictest integrity in the discharge of every obligation; trouble and expense are not to be considered when disappointment and displeasure can be averted. No establishment can exist long that becomes careless or allows its conduct to be justly criticised.

The proposition to place money for the payment of the limb on deposit with some bank, to be paid to us as soon as the limb is received and found to be satisfactory, is often made. We invariably decline

to accept of such terms, as money so deposited is subject to such conditions that the feature of security is removed. The money cannot be drawn unless the party ordering the limb gives his consent. If he declines to accept of the limb from caprice or hasty judgment he can demand his money and we have no redress.

We have no objections to delivering our goods to druggists, merchants, corporations, and business houses bearing acceptable mercantile standing. It must always be understood, however, that the goods they order must be accepted and paid for. We, of course, are under obligations to supply goods that are free from faults and defects, and covered by the guarantee given in this book.

INSTALLMENT PAYMENTS.

We are willing to accept of payments on the installment plan, provided such obligations are imposed as will make the payments absolutely sure. We will require the first payment to be not less than one-quarter the value of the limb ordered; the balance can be paid, in large or small amounts, weekly or monthly, as may be desired. We require all deferred payments to be secured by reliable business persons.

Upon request, we will forward an installment blank, which is to be filled out by the purchaser. The dates and amounts of deferred payments are to be properly specified. The guarantee attached to that paper is to be filled out and signed by one or two acceptable business men. We shall insist upon the guarantors being business men, as we can more readily ascertain their business standing and reliability, which are reported by commercial agencies. Professional men, such as ministers, lawyers, and doctors, also farmers, retired men, employees, and agents, are not rated by any commercial agency; therefore, it would be difficult for us to ascertain their commercial standing.

We believe that there are but very few dishonest persons in the world. It is a very rare exception that we find a person whose motives and impulses are void of integrity. Many promises are made in good faith; but, on account of the inability to fulfill such promises, they go by default. A poor man needs an artificial limb; he is without money, and his pride keeps him from begging; he has the promise of a situation as soon as he gets his limb; the future is, indeed, very promising and bright. He may go to his minister or his doctor and appeal to him, and it is almost certain that he will be met with favor, and the clergyman or the doctor will promise to go security for him; the limb is obtained, the man wears it, he gets his situation and earns his wages; he becomes a little careless in his expenditures, or some relative or dear friend becomes afflicted and requires some financial help from him. The time arrives for payment to be made, and the young man has no money. The minister or the doctor who has guaranteed the payments feels that it is unjust to be called upon to make the payments. He writes a pitiful letter, and time is extended.

This is repeated until patience becomes exhausted, and drastic measures have to be resorted to. It suddenly dawns upon the manufacturer that it would be poor policy to force payment out of the minister or to make enemies with the doctor, and the matter is dropped: the manufacturer suffering the entire loss.

This is an old, old story, so often enacted in life that the manufacturer has been forced to accept of none as guarantors except men engaged in business who have acceptable mercantile standing, and are prepared to meet their obligations.

OUR GUARANTEE.

Every leg and every arm delivered from this establishment is protected by the following guarantee:

GUARANTEE.

Artificial_____, Order No._____,

Class No._____ Made for_____

_____

and_____ this day to_____

is guaranteed to be made of the best material, and in a thoroughly workmanlike manner. Should any defects present themselves, we obligate ourselves to make the same good, without charge; provided the limb is delivered to us as soon as such defects have become known, and before the limb has otherwise become impaired. This guarantee to be good for a period of five years from date.

It is well to note that this guarantee does not obligate us to keep the limb in repair for five years, irrespective of accidents, improper treatment, or extraordinary wear; nor does it obligate us to reconstruct the limb to meet changes that may take place in the stump.

(Signed,)

*Dated*_____

701 *Broadway, New York.*

A. A. Marks

HOW SOON AFTER AMPUTATION SHOULD AN ARTIFICIAL LIMB BE APPLIED?

Reason and experience agree: that the proper time to apply an artificial leg to a new stump is as soon as possible after the stump has healed and the patient has recovered from the shock.

When the patient has gained strength enough to move about on crutches and maintain his equilibrium, and his stump has healed, it is time that an artificial limb should be applied and worn. Nothing can be gained by waiting beyond that period. Delays are attended with dangers. A person walking on crutches is in constant peril; if his crutch breaks or slips he is in danger of falling and landing on the end of his stump. This occurrence is not rare; if it were we would not mention it. So many persons have fallen and injured their stumps that we feel it a duty to call attention to the danger. We have known of falls that have injured the ends of stumps so severely that secondary amputations have had to be made in order to remove splintered bones, bruised tissue, or disarticulated joints. If an artificial leg did nothing but protect the stump, it would pay for itself many times over.

Delay in applying an artificial limb gives the stump an opportunity to become enervated from disuse, soft, flabby, and large from lack of exercise. Joints are liable to become limited in their range of motion unless they are kept in activity. An artificial limb has a wholesome influence upon the stump. It induces a health-giving activity, maintains normal mobility in the joints, keeps the muscles properly developed, prevents sluggish circulation, and protects the stump from injury in case of falling.

We have applied limbs within a month after amputations with wholesome results. In the greater number of cases this interval is too brief.

It is impossible to state how much time should elapse between the surgical operation and the mechanical application. It is safe, however, to be governed by the following rule:

Apply an artificial limb as soon as the stump is healed and the patient has regained his strength.

It is a common error to assume that a stump will become hard and tough by time. Nothing can harden and toughen a stump except use. A stump will never become hard and tough until it is disciplined by an artificial limb. The hands of a laborer are strong and hard because he uses them in performing his work. The hands of a person not accustomed to manual labor are soft, tender, and delicate and become easily blistered, simply because they have not been disciplined. The same principle is applicable to stumps.

Surgeons appear to be at variance in their views on this subject. Some advise a premature application, while others advise the patients to wait six months or a year. The thoughtful surgeon will see that no time can be specified, that all depends on the condition of the case. The rule above suggested can govern him with safety. The following correspondence on this subject will, we hope, be read with interest:

STEPHEN G. COOK, M. D., 111 West Twelfth Street, New York City.

Dear Doctor: Your experience as a surgeon and physician, and more especially as United States Government inspector of artificial limbs, enables you to exercise a practical as well as a theoretical knowledge upon the very important yet open question of what constitutes a proper period that should elapse between the amputation of a limb and the application of an artificial one. You are doubtless aware that upon this subject surgeons differ very widely.

I desire to obtain your opinion for publication, and if you can see no impropriety I will thank you if you will write your views upon this subject.

Yours very truly

A. A. MARKS.

REPLY.

MR. A. A. MARKS.

Dear Sir: Your letter, asking my opinion as to the length of time to intervene between the amputation of a limb and the application of an artificial one, has been received, and in response I would say that I would allow just as long a time to elapse as is necessary for the thorough healing of the stump, and no longer.

In my opinion there are at least three good and sufficient reasons why the interval should be brief, to wit:

First. Because by disuse the muscles left by the amputation, and which in the future are to control the action of not only the stump but also of the artificial limb thereto attached, become *undisciplined;* that is to say, they lose the nice co-operation there is naturally between them and the will-power.

That muscles act under the strictest discipline needs no further evidence than to watch the skillful movements of any trained artisan and compare them with the bungling movements of the unskilled, the untrained, and the undisciplined. After an amputation the muscles left are necessarily for a time unused, and if left too long, lose the power of responding to and being governed by the will. The application of the artificial limb is the first impulse that arouses them from their long period of inactivity; hence, in my opinion, it should be applied just as soon as practicable after the stump has healed.

Second. My second reason is based upon the old physiological law that "action increases strength." Compare the muscular development of the blacksmith, the boat-rower, the trained athlete and gymnast, with those of gentlemen of leisure and pleasure, and the adage needs no further proof. The muscles of an amputated limb not only become undisciplined, but they also become atrophied, shrunken, and effeminate, and the longer they are unused the more atrophied they become. The shrinking of the muscular tissues is supplemented by a deposit of adipose tissue (fat), so much so that sometimes when the manufacturer of artificial limbs is applied to, he finds, instead of a hard and firm stump, what has more of the appearance of a mass of quivering jelly.

Third. My third reason is applicable to the loss of a lower limb only, and refers to the use of crutches. Under the most favorable circumstances it is a difficult task to learn to use an artificial leg skillfully and naturally, a task that some learn much more readily than others, the same difference existing between individuals in this respect as in learning a science or a trade. The patient who has learned to balance himself upon a pair of crutches, and to get along as rapidly and almost as easily as before he was injured, is very apt to become both discouraged and disgusted when, on the application of an artificial limb, he discovers he has to learn the art of locomotion all over again. Under such circumstances, unless possessed of more than the usual share of energy and determination, he is too apt to lay the artificial limb one side for intervals too long to enable him to become speedily accustomed to its use.

For these and other reasons that might be mentioned, my experience of over thirty years as surgeon both in civil and military life, as well as inspecting surgeon of artificial limbs for the United States Government, has led me to the conclusion that the period of time that should elapse between the healing of the stump and the application of the artificial limb cannot be too brief.

Yours very truly,

S. G. COOK, M. D.,

111 West Twelfth Street, New York City.

MANUFACTURER TO THE U. S. GOVERNMENT.

It has been the purpose of the United States Government since the early part of the Civil War (1861-1865) to furnish artificial limbs to every soldier, sailor, enlisted, or hired man, commissioned and non-commissioned officer of the army and navy, who lost a leg or arm, or both, while in the naval or military service of the United States.

In 1862 the first law bearing upon this subject was enacted by Congress. That law limited the issue of artificial limbs; but it was soon amended so that its benefits became more extended. In 1870 a new law was passed, which supplied artificial limbs to every person honorably discharged from the military or naval service of the United States who had lost a leg or arm, or the use of one or more of his members, while in the United States service, and repeated the issue every five years. That law was in operation for twenty years, and many thousand artificial limbs were supplied. In the early part of 1891 the Congress of the United States enacted additional pension laws and added to their lists hundreds of thousands of soldiers who had never before received a pension, or who had never dreamed of receiving any gratuity outside of the bounties which had been paid to them in times past. The same Congress that passed the invalid pension laws adopted measures by which additional benefits should be given to beneficiaries of the artifical limb laws, by changing the intervals of issue from five to three years, notwithstanding the fact that the Surgeon-General's Office exhibited records that proved that artificial limbs lasted more than eight years on an average, and that there was no necessity of abridging the frequency by which the soldiers could be supplied at Government expense. But Congress was determined that the maimed should receive additional benefits, and the three-year interval became a law, which can be briefly stated in the following words:

"Every officer, or enlisted or hired man, who has lost a limb or the use of a limb in the military or naval service of the United States, is entitled to receive, once every three years, an artificial limb or apparatus. The period of three years is reckoned from the last maturity subsequent to March 3, 1888.

"Necessary transportation to the manufactory and return, by the most usual and direct route, will be furnished to those desiring it, for the purpose of having artificial limbs fitted; but will not be furnished except for this purpose. Sleeping car accommodations will be given upon request."

Those whose maturity under the old law occurred between March 3, 1886, and March 3, 1888, were given a new date of maturity, namely, March 3, 1891 (the day the bill became a law).

As manufacturers to the United States Government, we have been

required to furnish bonds with two sureties, of five thousand dollars each, for the faithful performance of our work.

Records show that we have furnished at least three-quarters of the applicants with artificial limbs.

The favor with which our methods of construction is esteemed by the soldiers, is flattering and complimentary, and we feel under great obligations to them for the work which they have done in furthering our interests. The maimed pensioners of the United States are endowed with common sense. They are steady, reliable persons, and appreciative. They like common-sense limbs, and select those that are reliable, and which experience has taught them are worthy of their confidence. These are the reasons why our soldier patrons of 1865 are our soldier patrons of to-day.

Blank applications for Government artificial limbs and transportation will be sent upon request. These can be filled out, signed, and mailed to us. As soon as we receive them we will ascertain the date that the applicant will be entitled to a new limb, and at the proper time pass them to the officials at Washington.

Those who reside at a great distance, and do not care to travel, can remain at home and have their limbs constructed and fitted from measurements. We extend to them every protection, every assurance, every guarantee, and assume every risk, the same as we do to civilians.

We have on file the measurements, diagrams, records, and dimensions of all the artificial limbs that we have made during the past forty-three years, and can duplicate any limb, if so desired. If a soldier wishes to have a limb duplicated, in length, dimensions, fitting, or details of construction, he will be accommodated upon request.

We advise every pensioner to procure artificial limbs under the laws, and apply for them promptly upon the maturity of their claims, and lose no time.

When changes are made by Congress, the laws in force up to that time are always repealed. No one can predict what Congress will do. During the past few years the tendency has been to retrench and economize in the administration of public affairs, and much has been said, and more mooted, derogatory of the Government's liberality to the soldiers. As soon as that sentiment becomes more firmly molded, there is no doubt that some radical changes will be made, and the soldiers will be the sufferers.

OUR RECORDS.

We have a very complete record of the beneficiaries of the United States limb law, and know when many are entitled to new artificial limbs from the Government.

The three-year amendment not only changed the frequency of issues, but changed the dates of many; and as pensioners seldom keep the rec-

ords of their own cases, they like to be informed when the time arrives for them to apply for new limbs. We make it a point to keep our correspondents posted upon this matter. We keep a faithful watch of the doings of Congress and the rulings of the several departments. Any pensioner who desires to be placed upon our list for his own benefit can send his name, address, rank, company, and regiment, and he will receive every attention, without being placed under any obligations whatsoever.

THE LONGEVITY OF THE MAIMED.

There appears to be a belief, shared by the medical profession as well as by the laity, that the amputation of one or more of the limbs from the human body necessarily entails an abridgement of the allotted number of days of his existence, and that there is a law that establishes a ratio between the length of the life of the normally equipped man and that of the dismembered man. That the ratio is according to the extent and gravity of the dismemberment—the greater the quantity of limb removed the greater the abridgment. If a man is born to live three-score years and ten, provided he retains all his limbs, the loss of one limb will take at least ten years from that allotment; and if he loses two limbs the lopping off of a few more years will be the sequence. This supposed curtailment is attributed to the shock that the nervous system receives by the injury and the amputation.

Although this theory has been advanced by men whom we would gladly accept as authority, we have doubted that the subject had ever received a thorough investigation, and have been induced to believe that the theory is nothing more than the blundering surmise of some opinionated individual.

A rather cursory search for authority has failed to disclose anything reliable on the subject on which can be established any law that governs such cases.

During our career as protheticians we have had excellent opportunities to look into the matter. By looking over our records, which comprise the histories of many thousand crippled persons, we arrive at the conclusion that the dismembering of the human body plays no part whatever in shortening life. Our records date back to 1853. Forty-three years have now elapsed, and it is an astounding fact that, of the entire number of our patrons, less than twenty-five per cent. have died, and most of those have died from old age or accident; and in no case can we learn of a death that can be directly ascribed to the loss of a limb. We know of very few persons wearing artificial limbs who have suffered or died from pulmonary or cardiac diseases, and those who have died from those diseases were affected before their limbs were amputated. It is not an uncommon occurrence to have patrons call upon us who are over seventy years of age, and who enjoy excellent health.

As we investigate this subject more thoroughly we are persuaded that amputations enhance vitality, and render it not only probable

but positive, that on account of amputations, the lives of the subjects will be prolonged and free from disease.

It is a *prima facie* fact that diseased and mangled limbs will cause death if they are not removed, but this is not the phase of the question that we are discussing. Will the length of life of the person who has had his limb removed, on account of disease or injury, be less or greater than it would if his limb had never been diseased or injured, and had never been removed?

It is absolutely impossible to give a categorical reply to this question. But we assert, that by deductive reasoning we are brought to the conclusion that there is a compensation for the loss of the limb, and that that compensation lies in good health, prolonged life, and immunity from disease.

Rev. Edward Beecher reached the age of eighty-four. Evidences of decline had begun to show themselves. By making a false step he fell from a railroad train and had one of his legs so badly crushed that it had to be amputated. He recovered from the operation and had an artificial leg applied. He lived for eight years and enjoyed excellent health and remarkable physical strength and mental energy. It was his custom to take long walks every day, to preach strong and enthusiastic sermons on Sunday, lead prayer meetings during the week, perform the rites of marriage and burial, and attend to all the branches of his clerical work, almost to the hour of his death. Wade Hampton is now over eighty years of age. He had a leg amputated a number of years ago, and has worn an artificial one ever since. He is mentally and physically strong, and moves about with agility. General Daniel E. Sickles is over seventy-three years of age. He lost a leg in the War of the Rebellion, and has walked on crutches for over thirty years. He is seldom ill, has no organic disorders, is constantly about, mingling with lawyers and statesmen, ready at any moment to make a patriotic speech. John Pearson is now over eighty years of age. He lost a leg when past the meridian of life, and since that time has enjoyed vigorous health, is physically and mentally strong, and is noted for his great executive ability. He is constantly at his desk directing the management of his railroad enterprises. General Butler, General Wager Swayne, and scores of others who are prominent in state, legal, military, and industrial pursuits, whose names are prominently before us, are living examples of men who have been deprived of their limbs for a number of years, and are now beyond the Biblical allotment of life. These are, to our mind, indisputable evidences that nature amply compensates for the empty sleeve and the dangling trousers' leg.

The writer has never heard of a cripple becoming insane. He can recall but very few cases where cripples have committed suicide. The mental as well as the vital forces appear to become stimulated by the dismemberment.

Dare, Melrose, Conway, Leland, and Fitzpatrick are one-legged acrobats whose muscular developments are the envy of the world. Few possessed of natural limbs can vie with these athletes.

It is a noticeable fact that persons who lose their legs become very powerful in their arms, large in chest, and great in girth, and persons who lose their arms become powerful in their legs and large in girth. The loss of parts of the body conduces to health, life, and development.

A reasonable explanation may be found in the hypothesis that the removal of a part of the body lessens the demand on the vital forces and permits the supplying reservoirs to contribute more abundantly to the remaining members. If it overtaxes the heart to force the blood through all the avenues of the body, will not the labors of the heart be lessened if a few of those avenues are forever removed? And will not the remaining avenues receive a larger share of the life-giving essences? If the nervous system is overburdened, will not the tax be lessened if a part of the nerve organization be removed? If a tree is permitted to grow at will it will sap itself by the many choking branches that grow from its trunk. The cutting off of these branches and the trimming up of the limbs always give new vigor to the tree. It will grow larger, stronger and will live longer.

It has been said that a maimed person takes better care of himself, does not expose himself to the elements, or to the dangers that beset human beings; that, on account of being crippled, he is compelled to be more cautious than others; he cannot indulge in that riotous, inebriate life which wrecks so many lives. In this connection we will say, and we speak from knowledge, that a person who is deprived of one or more of his limbs is not necessarily a convert to a life of virtue. He is not the sober man, the teetotaller, or the epitome of morality that some persons think he is. He goes through life in the same careless manner as other mortals, doing what he ought to do, and many times what he ought not to do. He sometimes observes propriety, but oftentimes is reckless, the same as his companions. He becomes drunk and indulges in excesses the same as others. There are, however, many maimed persons who are sober, industrious, thoughtful, prudent, and religious. The same habits, indulgences, and discretions that are found among those in possession of their natural limbs are found in about the same proportion among those who have been amputated. The loss of a part of the anatomy does not affect the *morale*.

It is an error to suppose that the loss of a limb induces despondency. There will not be found a class of people on the face of the earth who are less lugubrious and who lament their losses as little as that class of truncated humanity who have abbreviated extremities. We recall the visit of a man some years ago who had both of his legs and one arm amputated. After reciting a harrowing tale of a railroad collision and fire, and weeks of suffering at the hospital, and his recovery to health with only one of his four limbs remaining, he closed his narrative with the ejaculation: "Thank God, it was no worse!" This illustrates fairly well a crippled man's disposition. He is more thankful that he has not lost more, than he is regretful for having lost so much. He is constantly meeting with persons who, in his mind, have met with greater hardships than himself. It is an ordinary occurrence for a

one-legged man a meet a one-armed man, and for each to say of the other, "I prefer to be as I am rather than as you are."

A *cripple* is neither a cynic nor a pessimist. His misfortunes have driven from him whatever there may have been of the misanthropic. He is always in good health. He is, therefore, a better, a happier, and a more contented man than the dyspeptic, the rheumatic, or the gouty man, who is in possession of all the limbs that he is entitled to. It is a common occurrence for a man wearing two rubber feet to take consolation from the fact that he can never be troubled with corns, gout, or suffer the excruciating pain of having some ponderous lout tread on his feet.

Nature, with her usual generosity, compensates for every misfortune. We look about us and see conditions that are appalling, and are impelled to pour out our commiseration; but we little think how useless, how unsolicited, and often how uncharitable it is for us to do so. Those that are the most afflicted need our commiseration the least. Their minds and dispositions have already been prepared by Nature to bear their misfortunes, and they dislike to have others notice or mention them, much less to shed tears over that which they so little regret themselves.

AMPUTATIONS PROTHETICALLY CONSIDERED.

Read before the Section in Military Medicine and Surgery of the First Pan-American Medical Congress, Washington D. C., September, 7, 1893.

Intercourse with a considerable number of surgeons—those who reside in the centers of prothetical industry as well as those who inhabit more remote parts—discloses either a limited knowledge of, or a diversity of opinion on, the subject of amputations when viewed in the light of prothesis.

In consequence of this unfortunate absence of concerted thought and knowledge, artificial limb-makers have frequently brought to their presence stumps that are good, bad, and indifferent; stumps that could have been better; stumps that reflect credit, discredit, and no credit on the surgeons who performed the amputations, or on those who attended to them after the amputations were performed; stumps that can readily be inserted into artificial limbs with the assurance that no trouble will follow, and that the possessors will live in the sublime consolation of having realized the removal of their disabilities for all practical purposes; stumps that might have been better and would have been beyond criticism, had the operators taken advantage of opportunities which familiarity with prothetical methods would have revealed to them.

The time has arrived when this subject should receive more thought, and when prothetical knowledge should be more widely disseminated.

We can see in the not very distant future the subject of prothesis embraced in the curricula of the schools and colleges of surgery, when a graduate will be equipped with all the information requisite to guide him to not only amputate properly, but to put the stump in the most favorable condition for the prothetician; to take measurements, diagrams, and casts (when necessary) to enable his patient to obtain a suitable appendage with the least delay; when his knowledge will enable him to detect defects in adjustment, and to remove them; to prescribe alterations that may be required to accommodate changes that may have taken place in the stump.

As surgeons will always be more numerous than leg-makers, it is all the more important that their information on this subject should be broad, thorough, and correct.

We shall discuss the subject of Amputations Prothetically Considered from but a few standpoints, confining our views to amputations of the lower limbs only.

I. *Length of Stumps.*—Any stump that is well covered with integumentary tissue cannot be too long. We are well aware that when we advance this proposition, we antagonize the views of those artificial

limb-makers who have not kept abreast of the times, and that we are controverting the rules that have been laid down by some writers of repute on the subject.

Artificial limb-makers not many years ago, almost to a unit, decried the amputation of a leg below the junction of the lower and middle third, or "the point of election," so called, and were pronounced in their utterances against all ankle and partial foot amputations.

The methods which were then employed produced artificial legs that were not capable of adaptation to long stumps, particularly to stumps that extended to the ankles or below the tarsus. We may add that those adverse opinions on long stumps are still held by some prothetic-ians, notwithstanding the fact that great departures have been made during the past decade or two in prothetical methods. Hence, when a leg-maker of modern times says that an amputation should not be made below the point of election, you may regard him as confessing that he is behind the times, and has not the ability to make a leg that can be worn on a long stump.

Artificial legs are made at the present time that can be worn on stumps of any length,—tibio-tarsal, medio-tarsal, and tarso-metatarsal not excepted,—and it can be asserted that any stump that is capable of bearing weight on the extremity is preferable to one that cannot. A tibio-tarsal amputation made after the method of Mr. Syme produces an end-bearing stump, and can be placed in the category of "the most favorable." An amputation after Dr. Pirogoff's method is also productive of an end-bearing stump, provided the os-calcis is properly placed and united to the tibia, or securely held in the inter-malleolar space. An amputation in the tarsus, or at the tarso-metatarsal junction, after any of the methods of Chopart, Lisfranc, Hancock, or Hey, is productive of a stump that is capable of excellent prothetic treatment.

In every partial foot amputation, care should be exercised to prevent the contraction of the tendo Achillis; usually lashing in a suitably contrived splint will suffice. If this means will not accomplish the object, either tenotomy or fixation of the ankle-joint should be resorted to, for if the heel is allowed to retract and the amputated surface point downwardly, the possessor of that stump will be obliged to have an artificial leg applied that will not touch, but that will shield the amputated surface; this means that the artificial leg will elongate that side and necessitate the wearing of a thick sole and heel on the shoe worn on the companion foot. Such a stump ceases to be an end-bearing one, and its disadvantages are apparent.

Those modifications of Chopart's and Pirogoff's operations that do not provide flaps on which the weight of the subjects can be endured, tax to the uttermost the skill of the best prothetician. A case was brought to our attention some years ago, which we can opportunely refer to here. A young man, a farmer by occupation, residing in Vermont, had his foot crushed. Amputation was deemed necessary. A modification of Chopart's operation was performed. The stump that resulted presented the appearance of an inverted cone, the apex scantily covered with tissue and extremely sensitive. This stump was hope-

lessly an end-bearing one, and had to be treated the same as if amputation had been made above the ankle. It is obvious that inasmuch as a Chopart's operation could not have been performed, a Pirogoff's or a Syme's, or even an amputation above the ankle, would have given the patient better results.

The advantages of a totally or partially amputated foot, producing an end-bearing stump, over a leg amputation are many. The more important are the following:

First. An artificial leg for an ankle or partial foot amputation costs only half the standard price of an artificial leg for an amputation above the ankle.

Second. An artificial leg for any of the above end-bearing stumps does not incase as much of the leg and thigh as an artificial leg for an amputation above the ankle.

Third. A person with a stump extending to the ankle can improvise a sheath with suitable pad, on which he can rest his stump and walk tolerably well; or, if his stump extends to the metatarsus and a portion of the foot remains, he will be able to get about very well without any contrivance. These are vital considerations for the poor man, and should be regarded by the surgeons.

The most modern and improved artificial legs for ankle and partial foot amputations provide phalangeal support. This is conceded as absolutely necessary to aid progression and prevent limping. The absence of phalangeal support is always felt by those who do without prothetic assistance.

During the past few years we have personally superintended the construction and application of many hundred legs designed for tibio-tarsal, medio-tarsal, and tarso-metatarsal amputations. During the existence of the house of A. A. Marks, over eighteen thousand subjects, with amputations at various points of leg, thigh, and arm, have been supplied with artificial limbs. With this experience we feel competent to say that long stumps with ample flaps, that stumps resulting from tibio-tarsal, medio-tarsal, and tarso-matatarsal amputations, can be supplied with artificial legs that will be comfortable and pleasant to wear, and that will restore the wearers to the amplitude of their usefulness.

A stump extending below the knee is preferable to a stump extending to the knee, provided the stump is capable of flexion and extension. If the stump is disposed to become extended and anchylosed, it will be preferable to sacrifice the leg to the knee.

We had occasion to share the regrets of a subject that was brought to our office not many years ago. This man's leg had been amputated about four inches below the knee articulation. The stump was extended and anchylosed. To make an artificial leg for him would necessitate a rigid knee in the artificial or an articulated knee out of parallelism by about four inches with the natural knee. Either would place the fellow at a disadvantage, especially when sitting. If in the amputation of this leg the operator had had any indication that his patient's stump would have become extended and anchylosed, he would have displayed greater wisdom if he had amputated through the knee

articulation. Any amputation below the knee should, as far as possible, be made with proper regard for the preservation of the knee mobility, and during the recuperative period the knee should occasionally be forced into action, so as to prevent impairment of the power of flexion and extension.

A stump extending to the knee is preferable to a shorter stump. The condyles of the femur should never be excised in knee disarticulations. These nodules afford means for securing an artificial leg, and the condyles and articulated surfaces are better prepared by nature to endure pressure than the saw or the knife of the surgeon can prepare them.

If the patella can be placed in the inter-condylar space and properly secured, it is always desirable to do so. Otherwise it had better be removed.

The foregoing, we hope, will serve as an appeal to every operating surgeon to sacrifice as little of the human limb as possible, giving a proper regard to the securing of integumentary tissue for the purpose of covering the extremity and protecting the partly excised bones. These are certainly the teachings of the wisest and most conservative surgeons of the past, and we know of no reason why they should now be relegated to obsolescence.

II. *Flaps.*—All stumps should be provided with ample flaps, not redundant flaps. A redundancy of tissue on the extremity of a stump is no advantage. The prime office of flaps is to protect the extremity of the bones, and they should be only ample to effectually perform that function. Whether the flaps are anterior or posterior, exterior or interior, or a combination of the four, it matters not so long as the extremities are well protected. Periosteal flaps are desirable, as they give additional protection to the bones, and prevent integumentary flaps from becoming adhered.

If an amputation is to be made below the middle third of the leg, bone should be sacrificed in order to obtain flap. If the amputation is to be made above the middle third, bone should not be sacrificed. Every inch of healthy bone above the middle third is desirable for leverage purposes. If a thigh amputation is to be made close to the knee, bone can be sacrificed in order to secure flap. The nearer the amputation is to be made to the body, the greater should be the care to save bone.

III. *The Location of Cicatrices.*—The rules established by all the accepted authorities on ankle and partial foot amputations should be rigorously observed in the matter of cicatrices. By so doing the cicatrices will be placed in the most advantageous locations for prothetical purposes.

In all amputations in the leg, thigh, or knee, the cicatrices should as far as possible be placed well away from the extremities, preferably along the posterior aspects. Adhesion or even contiguity of the cicatrix with the extremity of a bone is frequently the cause of suffering.

IV. *Treatment of Stumps after They have Become Healed.*—A stump, before it is called upon to operate an artificial limb, is an inactive rem-

nant of an active member of the body. On account of its inactivity, it becomes disposed to accumulate adipose tissue, and, if permitted to do so, it will become abnormally large and œdematous. If possible, this condition should be prevented by tight bandages. Bandages should be applied from the time the stump has healed until the artificial limb is applied. They should be as tightly drawn as possible and not interfere with circulation. They should be applied in the usual way, beginning at the extremity of the stump, and continued the entire length of the complete section of the limb above the stump. This means for a partial foot amputation that the bandages should be carried to the knee, and for a leg amputation that the bandage should be carried to the body.

We have frequently met surgeons who incline to the belief that an attenuated stump should not be allowed; on the contrary that it should be encouraged to grow so as to possess the dimensions of the companion leg before an artificial limb is applied. This certainly would be desirable if such growth would permanently and effectually resist the influence of an artificial leg to reduce the stump.

It can be stated for a certainty that an artificial leg will harden, solidify, and diminish any stump. In consequence of this, it is desirable to keep the stump as small as possible so as to minimize the changes that will follow the application and wearing of a leg.

V. *Time to Apply an Artificial Leg.*—It will be safe to apply an artificial leg to a stump that has resulted from traumatic causes as soon after the healing of the stump and the patient has recovered from the shock as possible. Nothing can be gained by waiting beyond that time. Waiting entails a loss of time and permits the stump to become enervated from disuse.

A stump that is the result of disease, especially if of a malignant nature, should be obliged to wait until there is a certainty that the pressure, confinement, and concussion that follow, more especially the initial operations, will not cause a recurrence of the disease.

A child who has lost a leg is never too young to have an artificial one applied. It should be observed that the tissues, bones, and articulations of an infant or a growing child must be forced into repeated action in order to become developed, healthy, and vigorous.

To hobble about on one crutch or a pair of crutches for a number of years is rather a severe and inhumane punishment to impose on a child because he is growing. An artificial leg of modern construction can be lengthened from time to time at a very slight expense, and, as it provides the nearest approach to a natural prop for the amputated side, it is the only means that will encourage healthful growth and symmetrical development.

To illustrate this fact, we can do no better than present the case of an infant brought to us by Dr. Bacon of New Haven, Conn. The child was not quite nine months old when we took her in charge. Her leg had been amputated two inches below the knee for congenital deformity. The stump tended to flex and remain so; anchylosis was feared. We applied a neat-fitting leg with knee articulation. It

held the stump in extended and flexed positions, according to the manner in which the child was held or placed. In a few months the child began to creep, a few months later she was able to stand, and later still she learned to walk. The artificial leg assisted her in all these stages of progress. She developed rapidly and symmetrically, and today she is a young lady of comely proportions, enjoying good health, walking as gracefully as one in possession of nature's limbs—a testimony of the wisdom of applying artificial limbs to the young when misfortune has deprived them of their share of extremities.

In the summer of 1893, George M. Sternberg, M. D., Surgeon General of the United States Army, and Executive President of the Section on Military Medicine and Surgery of the Pan-American Medical Congress, invited us to read a paper on "Amputations Viewed by an Artificial Limb-Maker," before the Congress.

We esteemed the compliment on account of the eminence of its origin, and felt that an opportunity had been presented which we should not allow to slip; that of presenting to the profession some deductions on amputations which we had made in the prosecution of our profession. The foregoing paper was hastily prepared and read before the Pan-American Medical Congress in Washington, D. C., on the 7th of September, 1893. Subsequently it was published in the New York *Medical Journal* and other medical periodicals.

It should be noted that the essence of the paper approves of the conservatism of the older authorities in sacrificing as little of the human body as possible, depending upon the willingness, ingenuity, and skill of the prothetician to substitute that which has been removed. The failures of many protheticians in devising desirable substitutes for long stumps have caused some to utter voices of condemnation on amputations that admit of stumps extending below the "point of election," claiming that such stumps were ill-suited for the wearing of artificial limbs, and therefore should not be made. We hope the foregoing paper will successfully controvert that fallacy.

THE RELATION OF SURGERY TO PROTHESIS.

Surgery is that branch of medical science that treats of manual operations for the healing of diseases or injuries of the body. Prothesis is the addition of an artificial part to supply a defect of the body. These sciences are correlative: what surgery cures by removing, prothesis restores by artificial means.

The close alliance of these sciences should compel close intimacy between the surgeon and the prothetician, and each should be acquainted with the methods of the other. If the surgeon is void of all knowledge of prothesis, his ignorance is likely to blight the prospects of his patient. If the prothetician is void of all knowledge of anatomy and physiology, which form the basis of the surgeon's art, he cannot help but blunder in the prosecution of his work. He may construct artificial limbs scientifically, but if he fails to fit and adapt them properly, his labors will bring disappointment. His knowledge should enable him to detect any abnormal condition of bones, nerves, muscles, or tissues, whether congenital, strumous, or otherwise, and his skill in adapting the artificial limbs should enable him to provide against the aggravation of malignant conditions.

Prothesis is the child of surgery. Ambrose Paré, the most distinguished surgeon of the sixteenth century, drew the plans, superintended the construction, and personally applied the artificial limbs that were worn by his patients. The science, however, did not remain long in the realm of surgery. Immediately after Paré's time it became an industry by itself and drifted into the shops of obscure mechanics, and it is not surprising that for over two centuries it lost its importance, and not until recent times has it displayed sufficient life to command the attention of its legitimate parent.

Surgeons are becoming more familiar with prothetic methods, and are giving more intelligent thought to the future welfare of those from whom they have removed diseased or mangled limbs.

The present is the beginning of an era in which prothesis is to be recognized as a successive stage of surgery, entitled to the dignity it deserves, and when this is fully realized there is bound to be less confusion among the surgeons and greater unity among the protheticians.

Surgery must lift prothesis to a higher level, and prothesis must do its part in directing the labors of the surgeon.

The opinions and prejudices of inexperienced makers must never be permitted to have an influence. When the surgeon expresses an opinion on the subject of prothesis that is not his own, he must be supported by some authority more significant than a self-opinionated leg-maker whose arrogance is more conspicious than his research is comprehensive. We have stood aghast at the audacity of those whose power of comprehension is limited, in condemning conservative surgery

simply because their ingenuity was too limited to enable them to construct limbs that were adaptable to long end-bearing stumps, which older and more experienced manufacturers have looked upon with favor for years.

Incalculable evil comes from the shops of incompetent manufacturers, and especially from those that have met with enough success to encourage their self-importance, but not enough to command the position of authority. Prothetic quacks are responsible for much of the misery that comes to the maimed. They ruin good stumps, convert lives which have the promise of comfort and relief into lives of pain and anguish, by foisting their crude experiments upon the credulous. The surgeon should look with disdain upon these charlatans. We cannot help feeling that the time is ripe for the legislatures of the States to take the matter in hand, and legalize only those who are competent and qualified—the welfare and protection of the maimed demand it.

There must be less diversity of methods, more genuine study, and less experimenting; artificial limb-makers must be made to agree on many essential points at which they are now at variance; rules must be established regulating the fitting and adjusting of artificial limbs, which when well established will make the lines of procedure so definite that the limb-wearer will be subjected to less experiments and be served in a more humane manner.

The schools of medicine and surgery should add to their curricula the subject of prothesis, and every student should be instructed to the extent that he will know where to amputate, how to treat the stump after it has healed, how to take measurements from which artificial limbs are to be constructed, how to apply and adjust limbs after they have been delivered, and watch the cases and know what to do when changes have taken place in the stumps, and above all, he must be instructed so as to distinguish between the proper and the improper methods of fitting. There is to-day no text-book upon the subject whereby the student can be tutored upon advanced American methods. Some years ago European writers placed in their books the ancient methods of German, French, and English manufacturers, such as Bechard, Mathieu, Charrier, Biggs, and incidentally referred to Palmer, Bly, and Marks. All the literature on this matter that we have seen has been ancient, foreign, vague, and desultory.

The prothetic knowledge of the surgeon at the present time is nothing more nor less than the opinion of the limb-maker whom he has chanced to meet: which is as likely to be misleading as it is to be reliable. Among the limb-makers there is no harmony. Every maker has a peculiar line of operation for himself, and most of them will sacrifice much rather than deviate from these lines. As long as this state of affairs exists, the unfortunate man who has had his leg or arm removed can neither obtain comfort from his surgeon nor feel assured that in selecting his limb-maker he has been judicious. He is cast upon the sea of doubt, and is just as likely to drift into the hands of the charlatan as he is into the haven of science and skill.

Education is needed, and legal protection should be granted. No man should be permitted to construct artificial limbs until he has given evidence of his fitness. The laws of the State and the country should be as rigid in licensing prothesists as they are in licensing dentists. A few years ago anybody could hang out his shingle and pull and fill teeth. After a number of jawbones had been broken, and great damage done to the faces and mouths of the victims of quackery, the law took the matter in hand and permitted none to practice dentistry until they had given evidence that they had been properly schooled and were thoroughly competent. It must be the same with artificial limb-makers, and we will hail with joy the time when the cripple will be protected by law the same as the man with a diseased or aching tooth.

One of the objects of this book is to present as many phases of stumps, and the manner in which they have been prothetically treated, as possible, and in this respect we hope and anticipate that this book will do some educational work.

In addition to what has been offered we desire to pass a few observations that bear more directly upon amputations and the treatment of stumps, and we will confine ourselves to the consideration of the subject under the following headings:

Length of Stumps.—The rule "of amputating with the least sacrifice," established by surgeons of the past and observed by conservative surgeons of the present time, *is golden;* and when one condition is imposed, it can be safely used to govern the surgeon in selecting a point at which an amputation should be made, in every case, whether foot, ankle, leg, thigh, or arm, and that condition is as follows: *no amputation should be made below a point at which a good integumentary flap can be obtained.* Bones must be protected by tissue in order to escape dangers that threaten every stump, and no stump can be too long, provided the end is covered by ample flap.

Flaps.—Before the knife is applied to a diseased or mangled limb, careful examination should be made of the tissues, and the amputation should be made at a point where dependence can be placed upon obtaining sufficient healthy tissue to form an ample flap. Imperfectly nourished or lacerated tissue can never be depended upon. The absence or impairment of the nutrient vessels will invite sloughing, and it is doubtful that any antiseptic treatment will prevent the decay. It is far better to sacrifice bone than to sacrifice flap.

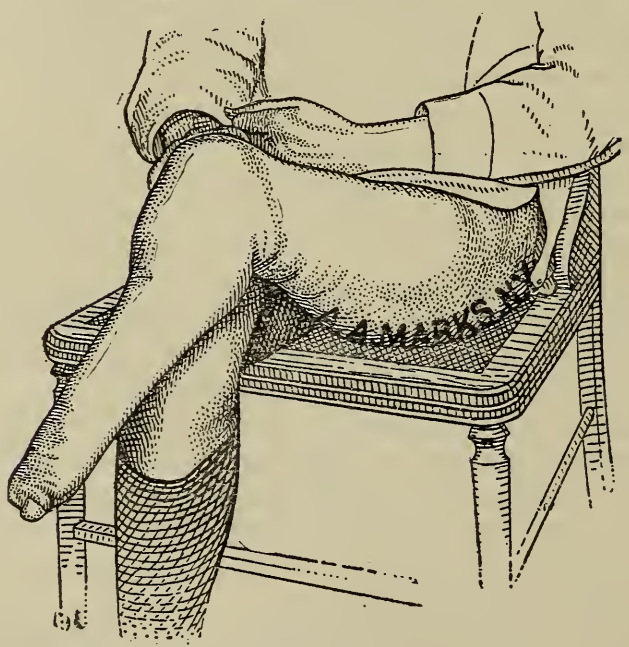
Anterior flaps are usually preferable, but it matters little whether flaps are anterior, posterior, or lateral, or whether the operation is circular in all short and non-end-bearing stumps; but in all long stumps, and particularly end-bearing ones, the flaps should be either anterior or posterior, and sufficiently long to not only cover the stump, but to place the cicatrix well away from the end.

Cut No. 1126 is an outline of a long leg stump. The amputation was made immediately above the maleoli. It proved to be an ill-advised place. Anterior and posterior flaps were brought to the bottom of the stump and sutured laterally across the extremity; as the tissues sur-

rounding the ankle were scanty, the flap could not be abundant. The cicatrix was placed at the most unfortunate part of the stump. The

No. 1126.

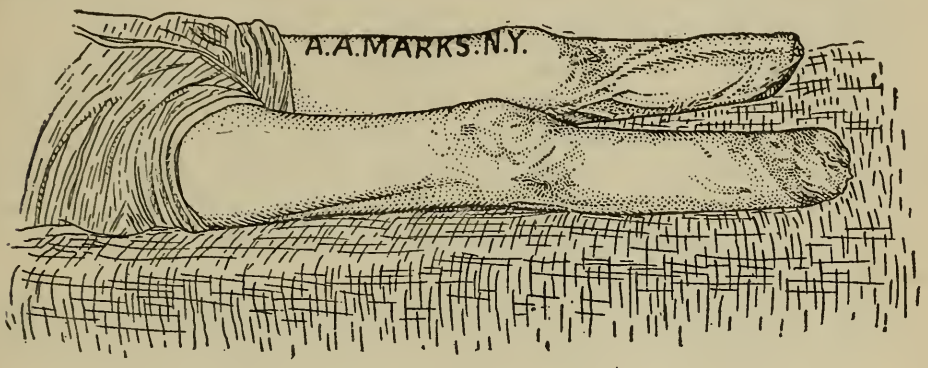
subject would have fared better if the amputation had been a few inches above, and a long anterior flap obtained and carried to the rear.



No. 1127.

Cut No. 1127 represents a stump extending to the ankle. A circular operation was performed, and as the flaps were either unhealthy or

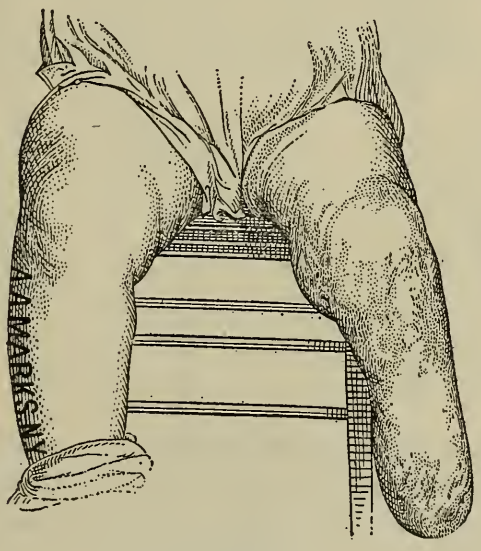
insufficient, the tissues retracted during the healing period and the fibula, which was permitted to remain a little longer that the tibia, became exposed and cicatrized. This was an unfortunate stump, the extremity being irritable and rebelling against any contact, pressure,



No. 1128.

or the slightest contractile force. A secondary amputation was found necessary after a few years of suffering.

Cut No. 1128 represents amputations of both legs just above the ankles. If more care had been given to the obtaining of flaps than to obtaining long stumps, the patient would have fared much better. The patient was injured by the railroad cars; both feet were



No. 1129.

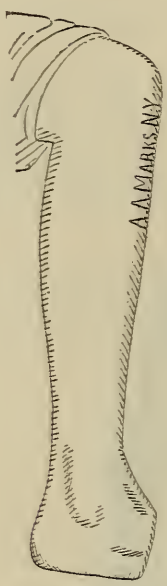
crushed and the tissues lacerated. The amputations were performed as close as possible to the seats of injury; flaps were formed of lacerated tissue, and the most rigorous antiseptic treatment was followed. Both stumps sloughed, and when they became healed their extremities were covered by cicatrical tissues. Although the subject is an active business man and walks remarkably well on a pair of artificial legs, there is hardly a doubt that at some future day secondary amputations will have to be performed. The stumps at times swell and are very sensi-

tive to heat and cold, and the imperfect manner in which they are nourished causes much suffering.

Cut No. 1129 represents an amputation close to the ankle, the extremity large and irritable. The artificial leg that receives the stump is necessarily large and clumsy, and the absence of healthy flap on the end of the stump is the cause of much suffering.

We very rarely find a stump that reaches to any point between the junction of the lower and middle thirds and the maleoli that is provided with an accommodating flap. The natural leg between those points is so scantily covered with tissue that it is difficult to find material from which a healthy flap can be formed. For these reasons we are fully persuaded that it is better to amputate at the point of election than close to the maleoli.

Ankle Joint and Partial Foot Amputations.—Amputations through the ankle articulation, or through the tarsus, produce commendable



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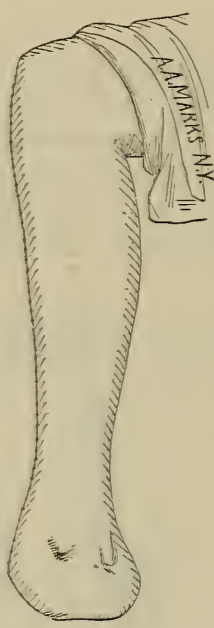


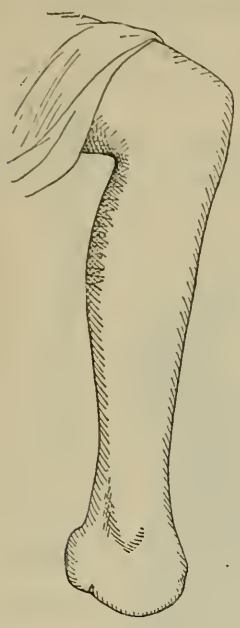
No. 1131.

stumps, provided good flaps are obtained and cicatrices are well away from the weight-bearing surfaces. Extreme care must be given in these operations to prevent the retraction of the tissues and the contraction of the tendons, for when a stump fails to become an end-bearing one, the purposes of retaining so much of the limbs are defeated.

Cut No. 1130 represents an amputation through the metatarsals; the operation was successful and the stump that resulted was beyond criticism. An artificial foot was applied, which has been worn for many years without causing pain, or subjecting the wearer to any inconvenience.

Cut No. 1131 represents an outline of a tarso-metatarsal amputation, after Chopart's method; the operation was skillfully performed and the results gave the surgeon much gratification. The subject has for a

number of years walked on a rubber foot in a very natural and comfortable way, and is engaged in a laborious occupation.



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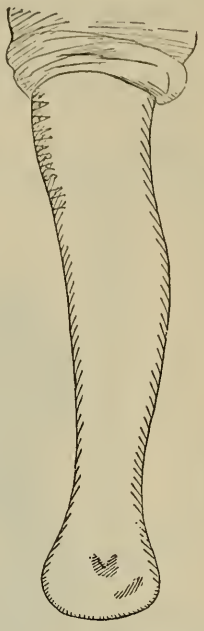
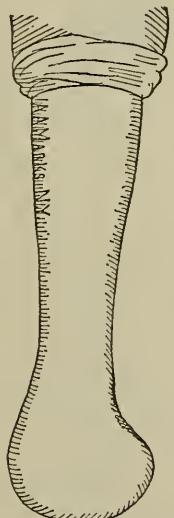


No. 1134.

Cuts Nos. 1132, 1133, and 1134 represent ideal stumps resulting from tarso-metatarsal amputations.

Retracted Heels and Contracted Tendo-Achillis.—When an amputation is performed in the foot, constant vigilance must be given



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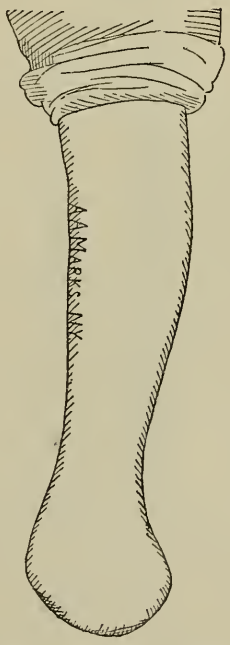

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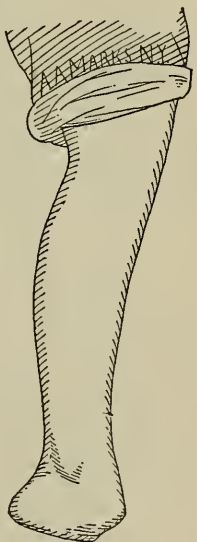
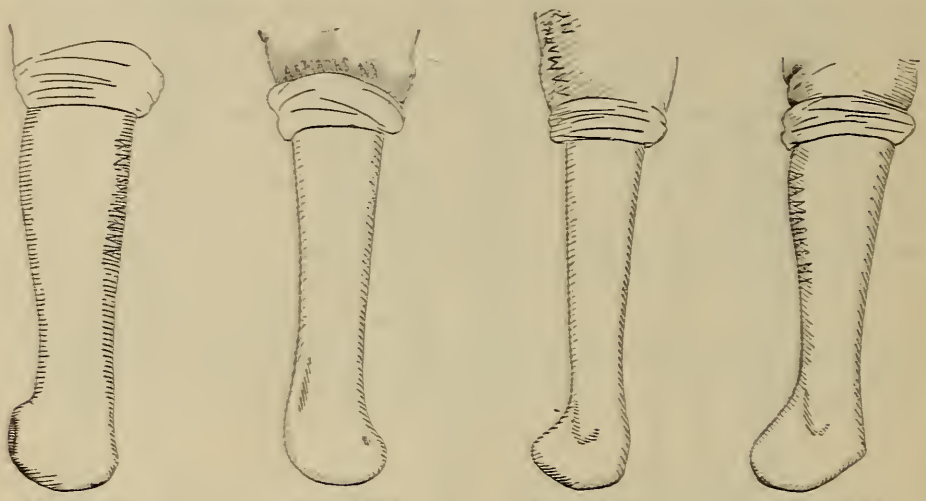


No. 1137.

to the disposition of the plantar surface, that it remain in its proper place, and also to the condition of the tendo-Achillis. Greater

care must be given to this matter if the amputation has been made above the insertion of the flexors; if there is a disposition on the part of the tissues to retract, or on the part of the tendon to contract, some

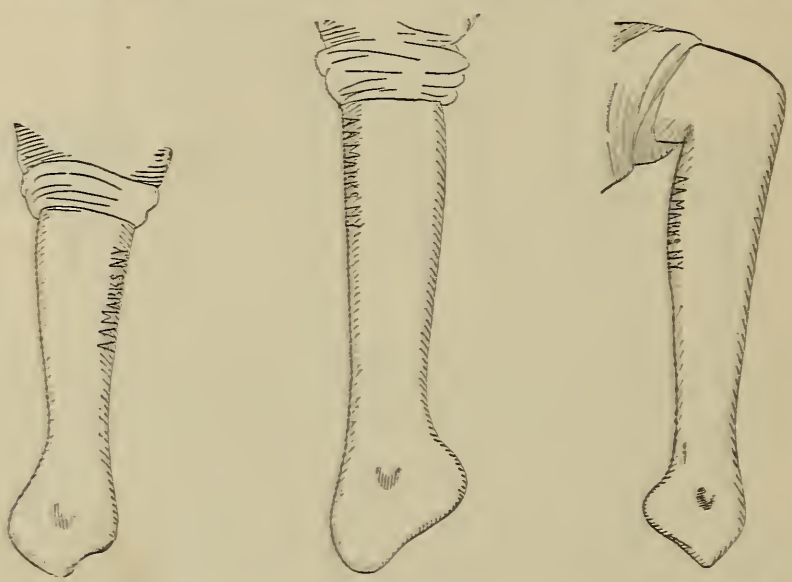


No. 1138. No. 1139. No. 1140. No. 1141.

opposition must be offered, and if this fails, tenotomy should be performed.

If the contraction is but slight, no serious trouble will follow; but if it is considerable the difficulties of fitting and adapting artificial feet will be greatly multiplied.

Cuts Nos. 1135, 1136, 1137, 1138, 1139, and 1140 are stumps resulting from partial foot amputations. During the healing periods the heels



No. 1142. No. 1143. No. 1144.

were permitted to slightly retract, but the retractions were not so great as to bring the amputated surfaces to the ground, or to make it impossible for the maker to adapt the limbs so as to bear comfortably on the ends and to prevent further retraction.

Cuts Nos. 1141, 1142, 1143, and 1144 represent stumps resulting from partial feet amputations, the heels retracted, and the tendons contracted so as to make the stumps non-end-bearing. Artificial limbs applied to these cases were not permitted to bear upon the extremities; they extended nearly to the knees, and received bearings immediatelybelow the knees.

Cut No. 1145 represents a partial foot amputation necessitated by gangrene of the toes and front part of foot; the heel became retracted,

No. 1145.

and the case was a very difficult one for the limb-maker. The appliance had to cover the leg to the knee, and take support immediately below; the lower part was necessarily very large. It is evident that an amputation considerably above the ankle would have given this man much better results. The comment of a prominent surgeon was that "There is no justification in undertaking a Chopart's operoperation for a gangrenous foot; sloughing is sure to follow, and the recurrence of gangrene is more than likely."

Cuts Nos. 1146 and 1147 represent partial feet amputations. The operations were performed through the astragalus. The extremities were only covered by cicatrized tissue. These are the most unfortunate types of partial feet amputations. It would have been far better if each amputation had been made through the ankle articulation.

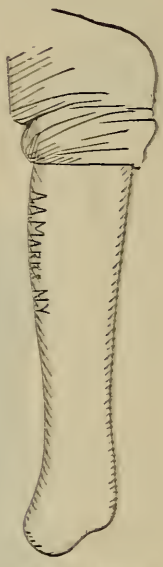
Cut No. 1148 represents a stump resulting from Pirogoff's operation. The os-calcis became slipped from the inter-malleolar space, but notwithstanding that fact, the stump became firm and strong and capable of excellent prothetic treatment.

Cut No. 1149 represents a Pirogoff's amputation, with the os-calcis properly placed and adhered. The stump is beyond criticism, and capable of enduring any hardship.

Cut No. 1150 is an outline of a typical Symes' stump, an ideal one, capable of the most excellent prothetic results.

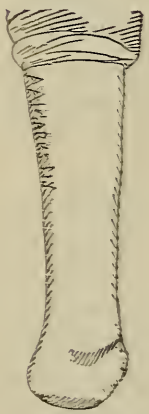
No. 1146.

No. 1147.



No. 1148.

Cut No. 1151 represents an outline of an ankle joint amputation. Two flaps were formed from the sides and brought together and sutured from the front to the back; the stump was not capable of bearing



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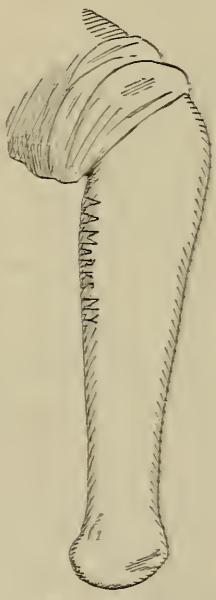

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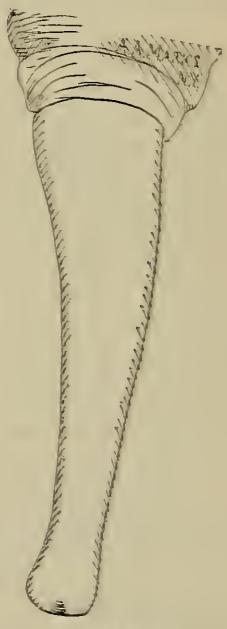
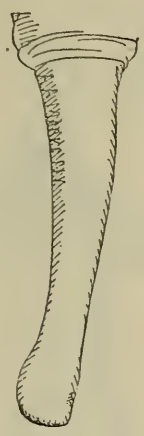


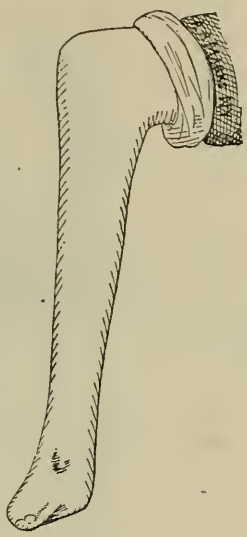
No. 1151.

pressure upon the extremity. If the flap had been from the rear and sutured laterally across the front the stump would have been an end-bearing one.

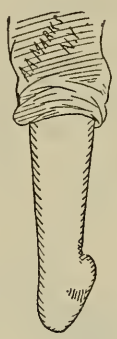
Cut No. 1152 represents an amputation through the ankle joint for the removal of a club foot—talipes valgus. The operation was commendable, and the subject was greatly benefited; a flap was carried from



No. 1152.

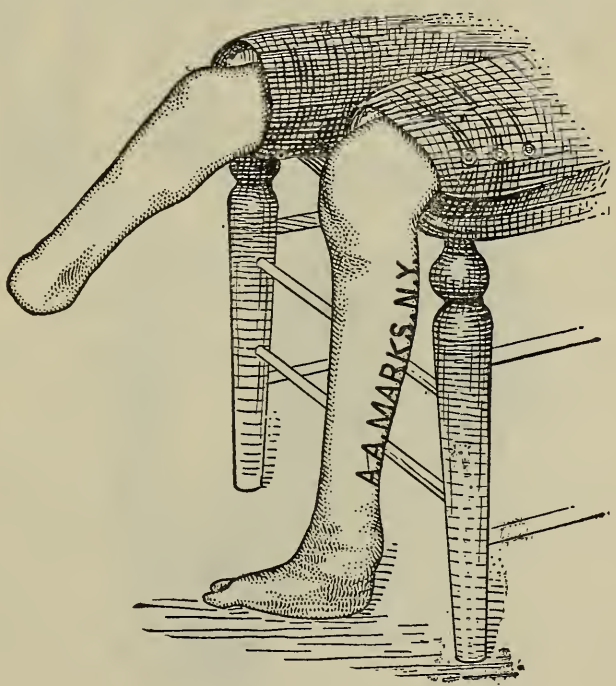


No. 1153.



No. 1154.

the interior side and sutured on the exterior side a little above the end—the stump was capable of bearing pressure upon its extremity.



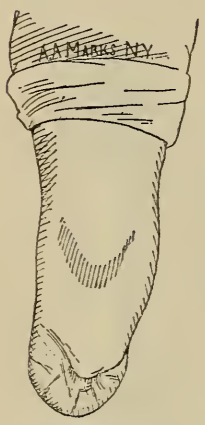
No. 1155.

Cut No. 1153 represents an amputation through the calcaneum, to remove club foot—talipes equinus. Good results followed. The stump was capable of bearing pressure upon the extremity, and the patient was greatly improved by the operation and benefited by the artificial limb.

Cut No. 1154 represents a stump resulting from an amputation to

remove a deformed foot; the extremity was naturally cushioned, and the subject became very expert in the use of an artificial leg.

Cut No. 1155 represents an amputation to remove a deformed right



No. 1156.

No. 1157.

foot which proved successful in every respect. The patient was born with both feet deformed; he was able to sustain his weight upon the left foot, but could bear no pressure upon the right. The right foot

No. 1158.

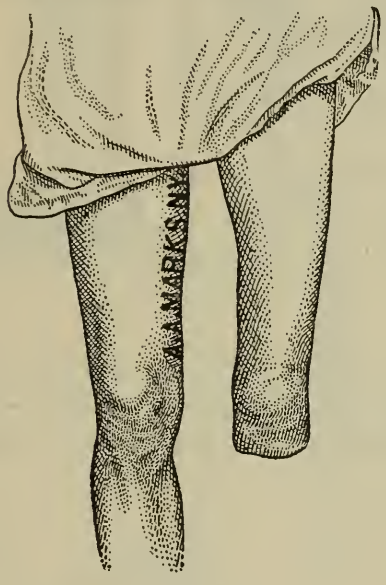
was amputated at the ankle, and an excellent stump was produced. An artificial leg was applied and the subject restored in a most complete manner.

Redundant Flaps.—We have endeavored to emphasize in the

strongest possible manner the importance of providing every stump with an ample flap. We do not wish to be construed as inferring that there cannot be too much flap; on the contrary, a redundant flap is objectionable, as it is always the cause of much suffering. Soft tissues hanging loosely from the end of a stump cannot be placed under control. Sockets must be fitted so that the soft tissues will be under lateral pressure, otherwise there will be a loss of motion: the bones, being surrounded by soft tissue, will move considerable distances before they can have any effect on the leg. Redundant flaps are always accompanied with deep fissures and large folds of tissue, where dirt and perspiration collect and cause irritation.

Cuts Nos. 1156, 1157, and 1158 represent tibial stumps with redundant flaps. Soft tissue hangs below the extremities and flops about in the sockets, frequently becoming displaced and troublesome.

Extended and Ankylosed Stumps.—If there is any indication that



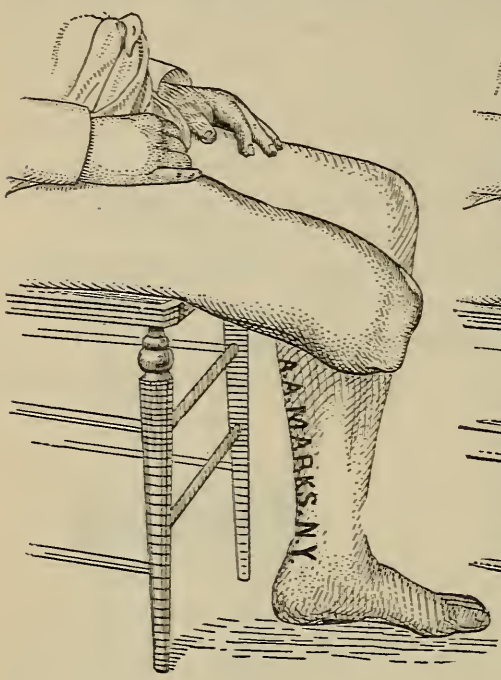
No. 1159.

No. 1160.

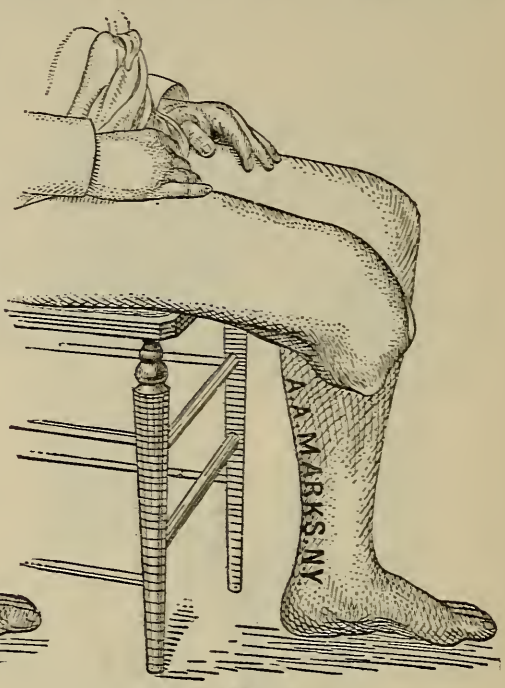
the knee motion will become permanently impaired, and an amputation is to be made above the ankle, it will be advisable to amputate through the knee. A stump below the knee extended and ankylosed as represented in Cuts Nos. 1159 and 1160 is unfortunate. Although a leg can be applied that will enable the wearer to walk very naturally, it will not be possible to correct the long protruding thigh, so conspicuous when the subject is seated. The knee-joints of the artificial leg may be placed in their proper positions, so that they will work on lines with the sound knee, and when the wearer is seated the artificial leg will bend so that the foot will remain on the ground, but the stump which is stiff will protrude beyond the natural knee, and be in the way. A part of the tibia, although well covered with flap, can be of no benefit when the knee is ankylosed.

If there is limited motion in the knee, and there is a possibility of improvement, and a good flap can be obtained, it is well to save the knee and as much of the leg as possible.

Cut No. 1161 represents a tibial stump at its fullest extension, and cut No. 1162 represents the same at its greatest flexion. It will be seen that the range of motion is less than twenty-five degrees. An



No. 1161.



No. 1162.

artificial leg with knee articulation was applied to the case above illustrated, and in a comparatively brief time full knee motion was restored. The results in this case justified the amputation of the leg at the point indicated in the cuts.

No. 1163.

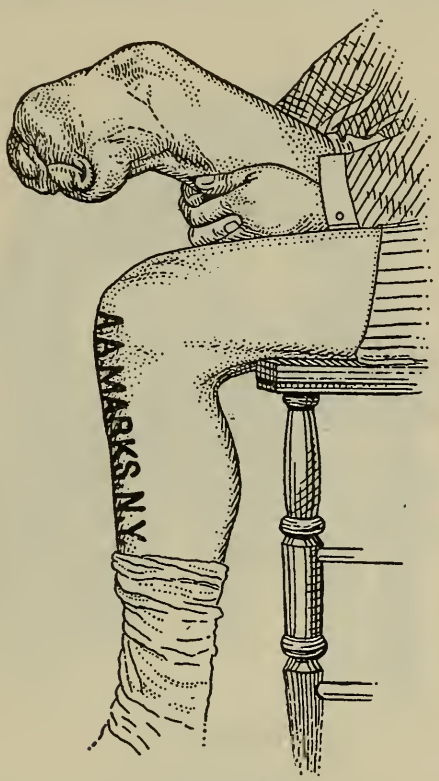
No. 1164.

Deflected Tibial Stumps.—We occasionally find tibial stumps that appear to be abducted at the knee, a condition that is found to be a source of anxiety to the surgeon as well as to the patient.

Cut No. 1163 represents a deflected tibial stump. The fibula has become deflected outwardly, and the tibia appears to have become abducted at its articulation. A careful examination of a number of

stumps of this character have satisfied us that no abnormal conditions exist in the articulating parts. The knee motion is generally perfect, and articulation is not attended with pain or unusual consequences. The interior aspect of the leg has, by atrophy, become scantily covered with integumentary tissue; this, with the deflection of the fibula, produces the apparent abduction of the knee. The condition is neither troublesome to the limb-maker nor unfortunate to the patient, as artificial limbs can always be adjusted with good results.

Anomalous Flaps.—Cut No. 1164 represents a tibial stump, right side, with the entire fibula removed, and the tissues permitted to form



No. 1165.

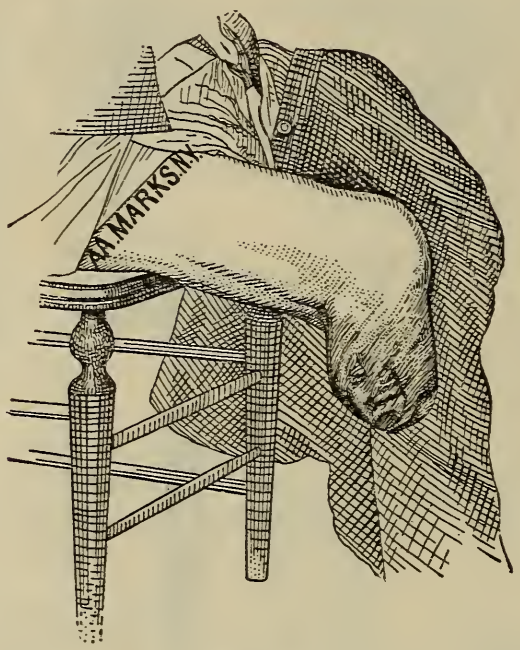
great folds on the exterior side. A cicatrix runs longitudinally from the end of the stump to the knee. The surgeon who performed this operation was in doubt as to the justification of retaining the tibia when the fibula had to be removed; fortunately the operation did not impair the knee movement, and as the tibia was strong and powerful, it could be depended upon in performing the work of flexing and extending the artificial limb. An artificial leg was applied, and the patient walked naturally and comfortably, and has worn it for a number of years without occasion for complaint.

Cut No. 1165 represents a tibial stump, the amputation being performed a little above the middle of the gastrocnemius muscle. During the healing process the muscles retracted, and the tissues about the extremity became puckered at the rear. Although this condition gave some alarm, the case was not found difficult for satisfactory prothetic treatment.

Cut No. 1166 represents a tibial stump. The operation was performed to remove a leg that had been badly burned; the amputation was performed at the juncture of the middle and upper thirds, the flaps were formed of scarified tissues, and consequently were irritable; advantage was taken of a few isolated bearing places, and a limb was applied. Three inches of this stump could have been removed to advantage.

Knee Disarticulations.—Amputations through the knee joints are not condemnable, notwithstanding the fact that many artificial limb-makers look with disfavor upon them.

In knee disarticulations every effort should be made to produce end-bearing stumps; this can only be done by allowing the natural cover-



No. 1166.

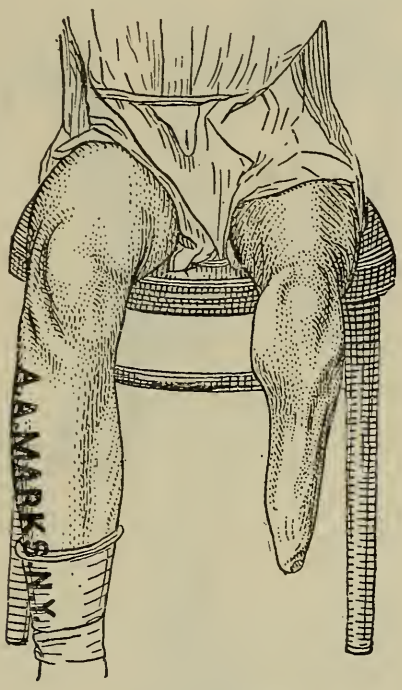
ings on the articulating surfaces to remain untouched, or to provide covering from periosteal and integumentary tissues, bringing the cicatrix well away from the extremity. If an end-bearing stump cannot be obtained in a knee disarticulation, it will be better to amputate at about the juncture of the middle and lower thirds of the thigh, and get rid of a sensitive extremity that cannot be of any use.

Cut No. 1167 represents a knee-joint stump, rear view. The patella and external condyle were removed; the internal condyle was preserved in its entirety; the flap was brought to the rear and the cicatrix well removed from the extremity. An artificial leg was applied so that pressure was placed directly upon its extremity, where it was endured without annoyance.

Cut No. 1168 represents a knee-joint amputation, the sides of the condyles removed, the flap carried over the extremity, the cicatrix placed at the rear and well away from the end. Weight was applied directly to the extremity and endured without suffering. In con-

is that the muscles will waste, and by the process of substitution the stump will become fat. When the stump is put to use. in controlling an artificial leg, the tissues are compressed by the socket, the stump is forced into activity, the hypertrophied tissue will waste, and adipose tissue will be prevented from forming by the pressure of the limb. For these reasons stumps that are obliged to work become atrophied, and those that remain idle become hypertrophied.

Cut No. 1174 represents a tibial stump that has been used to control an artificial limb for a number of years. The stump is atrophied and there is very little tissue about the bones; notwithstanding this fact the sub-



No. 1174.

ject is a well-developed, strong, and healthy man. With an artificial leg, well fitted, he performs the work of a laborer, and never suffers from abrasions.

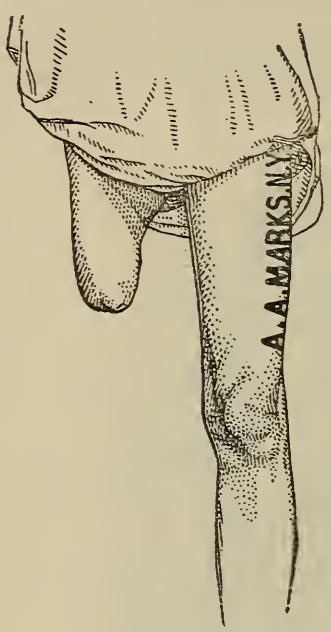
Cut No. 1175 represents an atrophied thigh stump. As shown in the cut, the stump is very much smaller than the sound thigh. The wearing of an artificial leg for a number of years has caused this emaciation. Atrophy does not cause any annoyance or inconvenience, as the subject wears an artificial limb constantly and without suffering.

It cannot be stated that *all* stumps will atrophy, any more than it can be stated that *all* stumps will hypertrophy. Many remain the same size for years. A person who is disposed to grow fat will carry that disposition to his stump, and it will either hypertrophy, or maintain its normal dimensions, and a person who is naturally lean will find that his stump will remain thin, or will atrophy.

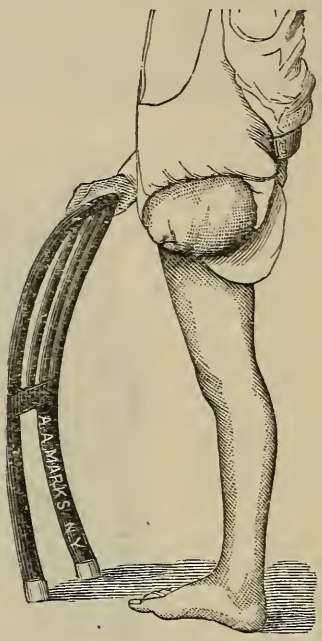
There are exceptions to these rules. We know of fat men who have atrophied stumps, but they are in the minority; and we know thin

persons whose stumps have never atrophied, but as so many stumps follow the rules above enunciated, it is a wise plan to take them for criteria. Therefore all stumps should be bandaged, and kept bandaged until artificial limbs are applied. By this means all possible changes will be minimized.

Bearings.—The places at which a stump can take pressure and sustain the weight of the wearer, when an artificial limb is in use, should



No. 1175.



No. 1176.

be understood. The surgeon, in many cases, has it in his power to establish and locate those places, and with a knowledge of prothetic methods his work in that direction should be facilitated.

An end-bearing stump is always desirable. Disarticulations in the ankles or knees, or partial foot amputations, can usually be depended upon in producing end-bearing stumps, and unless some disease of the tissues, flaps, or bones exist, and unless some neurological complications are present, those stumps are not disappointing.

Amputations between the articulations, or through the shafts of the bones, seldom produce end-bearing stumps. Non-end-bearing stumps must receive bearings about the enlarging parts immediately above the extremities. This means that a non-end-bearing stump below the knee must receive pressure on the interior, anterior, and posterior surfaces immediately below the knee. The styloid process of the fibula is always close to the surface and is surrounded by sensitive tissue and is painful to continuous pressure; therefore, the exterior surface must never be permitted to bear pressure.

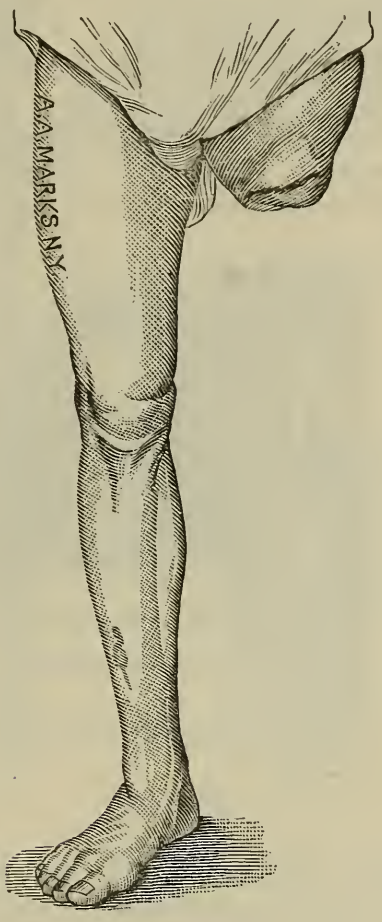
Tibial stumps that are well covered with periosteal and integumentary tissue can receive pressure on their ends, but these stumps are extremely few.

A thigh stump will never admit of weight being applied to its

extremity, unless the end of the femur is covered with a periosteal flap and that in turn well covered and protected by an integumentary flap with the cicatrix well removed.

An artificial leg applied to a thigh stump takes weight about the ischial and perineal regions, where the gluteal folds provide natural cushions.

Cut No. 1176 represents a thigh stump. It is held horizontally in order to show the mobility of the hip. The flap, as will be seen, is



No. 1177.

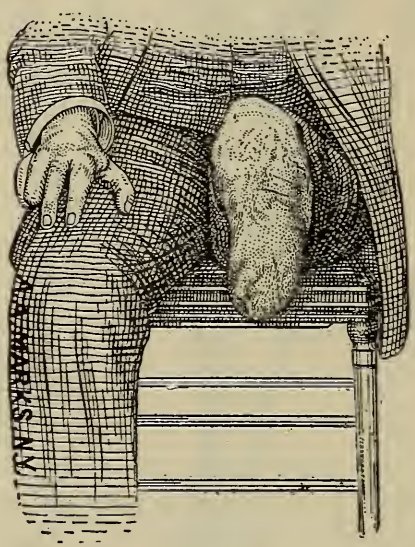
well carried to the rear and the extremity is well protected. This is a model short thigh stump; it can be depended upon to perform a vast amount of labor. Cut No. 1177 represents a short thigh stump, circular operation, with tissues adhered to the bone. The stump is covered with accommodating folds that permit displacement without pressure on the cicatrized end.

Sinuses.—Sinuses in the ends of stumps are sometimes the cause of anxiety, as they are stubborn to heal and frequently rebel against treatment. It is an error to assume that their presence prevents the wearing of an artificial limb. While we always condemn the premature application of an artificial leg, we have found when a stump is healed with the exception of a sinus, that the wearing of an artificial limb

stimulates the circulation, and is frequently the means of causing the sinus to heal. The end of a tibial or femoral stump with a sinus is never permitted to receive pressure, and when the limb is applied it hangs in space; therefore the presence of a sinus cannot prohibit the use of a limb.

Adhesions.—Every effort should be made to prevent the adhesion of a cicatrix with the bone. A stump that has loose and soft media on the extremity is capable of more hardship. Adhesions result from sloughing, or the provision of insufficient flap, or the placing of the cicatrix contiguous to the bone. They will rarely occur if ample (not redundant) flaps are made from healthy and well-nourished tissue and *carried well* over the stump and sutured well away from the end.

Conical Stumps.—The conical stump has been regarded as the "opprobrium of surgery." This term, however, applies only in cases where the degree of conicity is very great and the bone is permitted



No. 1178.

to protrude from the end, covered only by adhered cicatrized tissue. There are no valid objections to conical stumps when the extremities are well cushioned.

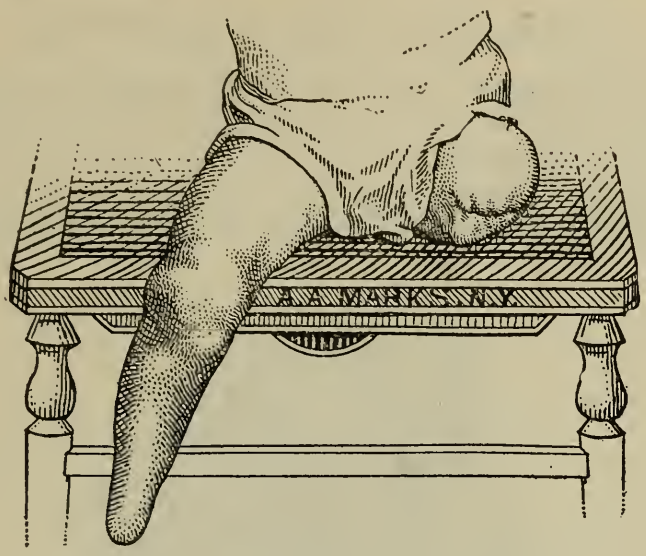
Cut No. 1174, page 343, represents a stump that has become conical from atrophy due to the wearing of a limb, but the extremity was sufficiently covered with integumentary tissue to remove all objections.

Cut No. 1178 represents a conical tibial stump in which the point of the tibia protrudes and is a source of annoyance. We do not infer that the surgeon is responsible for this condition, but if there is a method of treatment by which the protrusion of the bone can be averted, that method should be understood and practiced, as such stumps almost invariably demand secondary amputations sooner or later.

Cut No. 1179 represents a double amputation of right leg immediately above the ankle, and of the left well up on the thigh. The right stump is conical, but the extremity is well protected. This subject was sup-

plied with a pair of artificial limbs, which have been worn for a number of years in a most successful and highly gratifying manner.

The surgeon must never consider that his work is done as soon as



No. 1179.

the stump is healed; he must carry his art to another stage—he must prepare the stump for the artificial limb; he must tell his patient when an artificial limb can be applied with impunity; and he must make no error. If he does it will be discovered sooner or later, and unpleasant criticisms will be passed upon his skill and knowledge.

FROM THE STUMP TO THE LIMB.

The city establishment of the firm A. A. Marks occupies the entire building, consisting of five floors, basement, and sub-basement, of 701 Broadway, New York City.

The out-of-city buildings consist of a steam saw-mill and several storage buildings, thirty miles distant, located on the western border

No. 1180.—Willow Tree in Winter.

of Connecticut. The number of hands employed in the several departments will average over forty.

It is the object of these pages to take a run through the several departments, and follow the making of an artificial limb from the tree to the finish, the purpose being to convey to the reader the system and thoroughness of detail which enables the house to execute work for all the world.

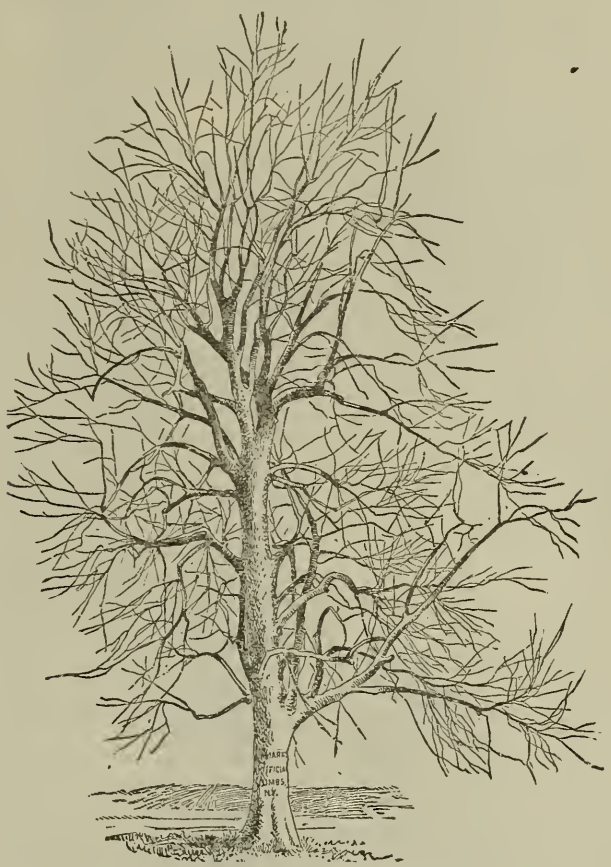
The adoption of wood in the construction of a leg is empirical, having stood the tests that have shown the shortcomings of every other available material—rawhide, leather, vulcanite-rubber, celluloid, papier-mache, tin, copper, steel, and pulp. Wood possesses strength and lightness, rigidity and durability; it does not heat the stump, and

retains its virtues for many years. All other known materials lack more or less of these qualities.

There are two kinds of wood that are peculiarly adapted to the purpose, Willow and Bass.

Willow or Salix is found in groups on the banks of streams and in marshy places; occasionally the tree is found isolated in a lonely lot.

This wood has but few uses in the industries; we read of the ancients using it for shields, to guard their bodies from arrows and the missiles of their enemies. In modern times it is charred for making gunpowder, crayons, etc. It is also turned into disks for polishing



No. 1181.—Bass-Wood Tree in Winter.

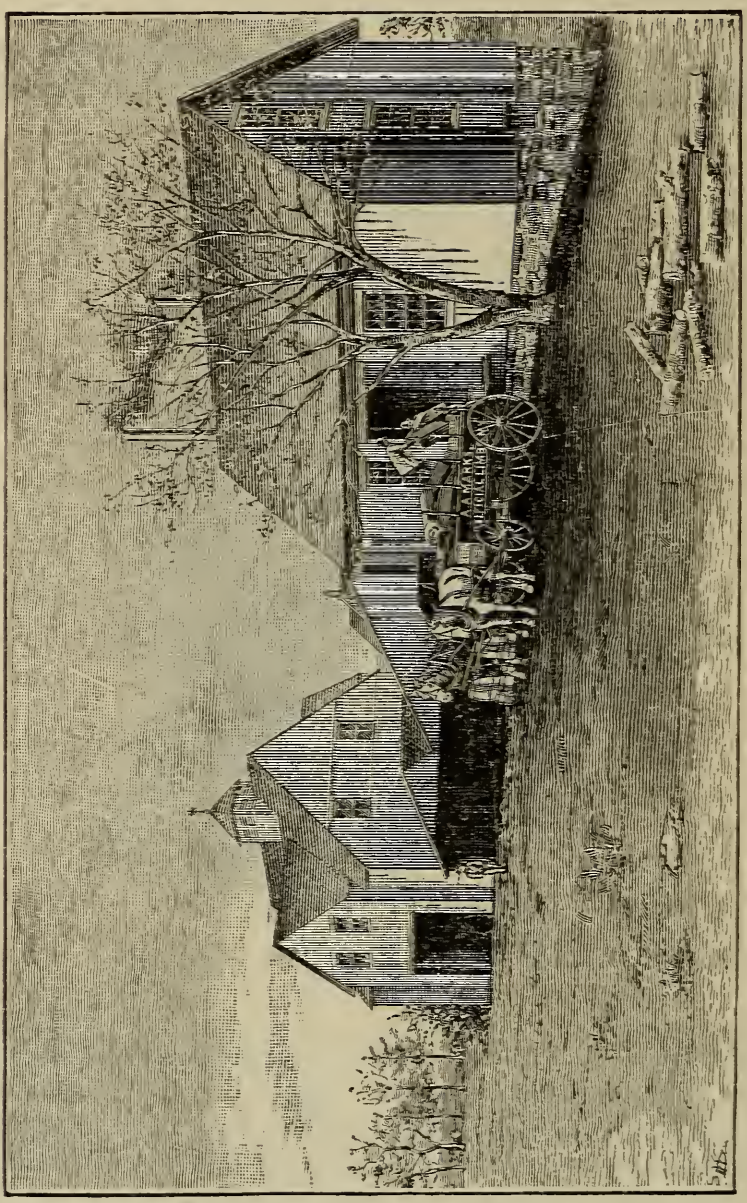
glass, advantage being taken of its fine and tough grain. As a general thing the wood is regarded by the forester as worthless; in clearing his land, he allows it to decay, or burns it *in situ*. Cut No. 1180 represents one of these trees, as it appears in nature, when the winter has divested it of its foliage, and when the woodman's ax and saw are about to fell it for artificial-limb timber. The tree is large, sheltering a great area of ground; it has a short, knotty trunk, frequently growing to six feet in diameter at the base and ten to twenty feet in height, when it divides into many great and far-reaching branches. There are many species of willow, most of which are suitable for the purpose.

Bass or linden is a worthy rival of the willow, though it has no

botanical relation with it. Cut No. 1181 represents a basswood tree in winter; its trunk is straight and smooth, its general form is symmetrical, its branches forming graceful curves and returning angles.

Both the bass and willow are native woods, abounding largely in New England. The trunks are only used in the art.

The India-rubber tree is indigenous to Central and South America.



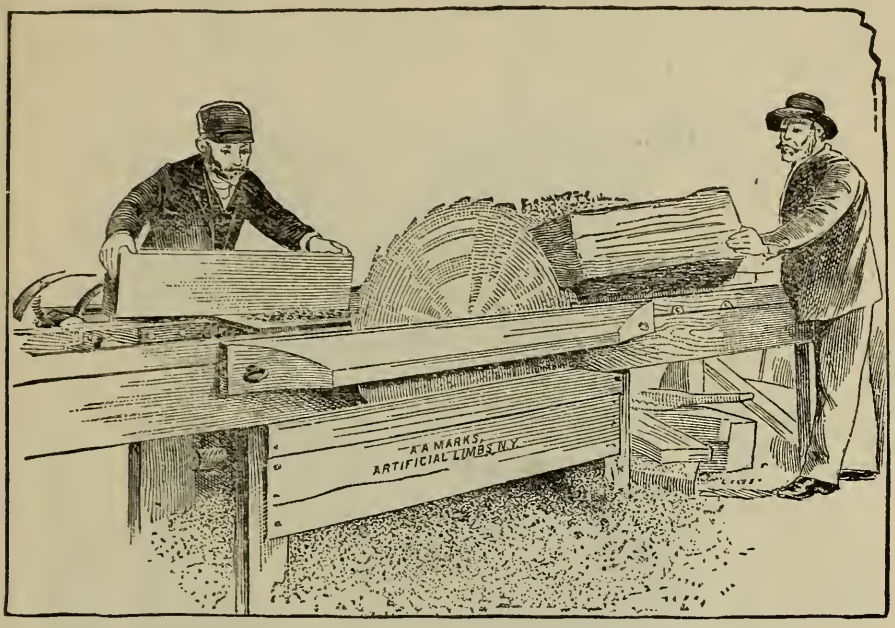
No. 1182.—Exterior of Steam Saw Mill and Dry-Kiln at Sound Beach, Conn.

The gum that oozes from its bruised surface is used in the manufacture of the feet and hands of the MARKS' patent.

Knowing what trees to select, we will accompany the woodman to the forest, which is likely to occur on a cold, crispy winter's morning, with a foot or more of snow on the ground; the company will probably consist of a dozen men, with axes, cross-cut saws, steel wedges, and

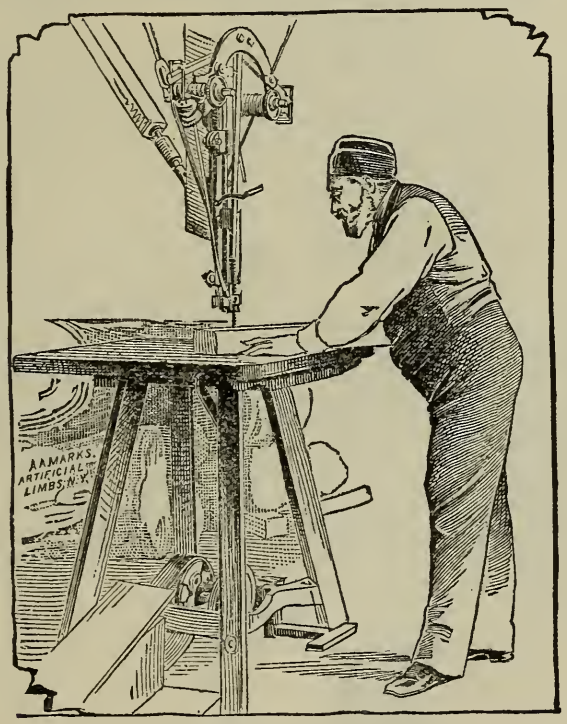
beetles, a powerful team of Normandies, a truck, drags, chains, and all the implements necessary for the rapid handling of great, heavy logs.

As a preliminary, the ax-man will cut away the hedges and clear the



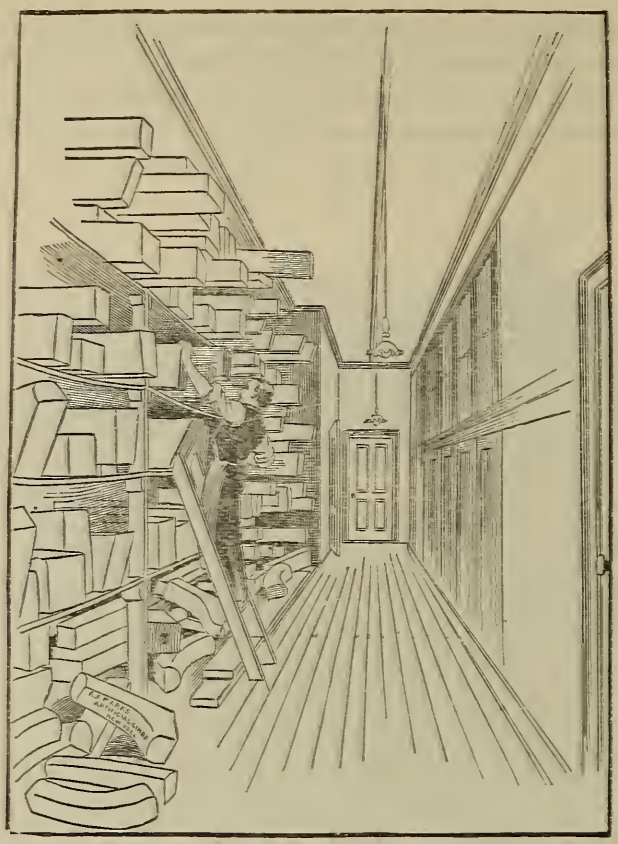
No. 1183.—Buzz Saw Cutting Artificial Limb Timber.

way for the sawyers, who will apply the cross-cut saw horizontally and as close to the ground as possible. The tree will soon yield and



No. 1184.—Jig Saw in Mill.

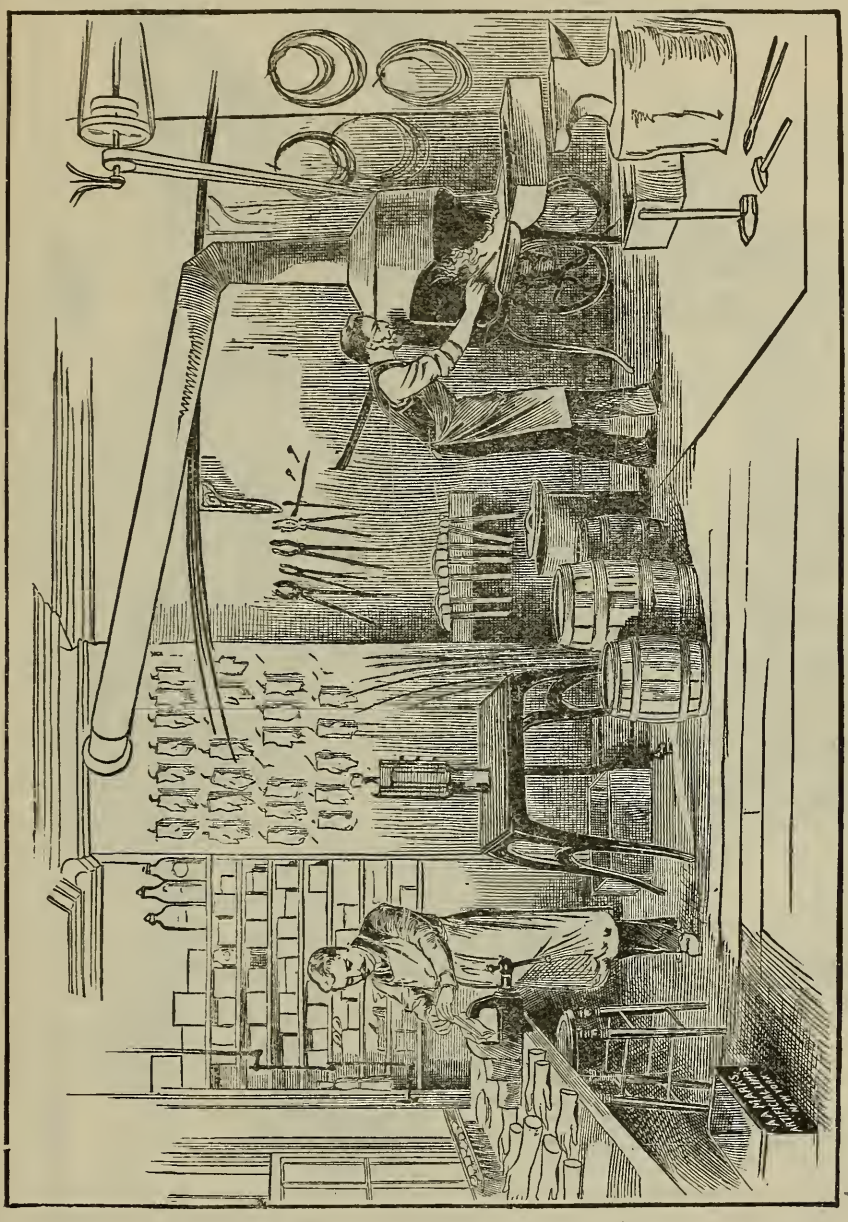
fall to the ground, where it is cut into logs of suitable lengths, then split into sizes by use of wedges and beetles. The truckman piles the



No. 1185.—Timber Stock at Factory.

No. 1186.—Sock and Supply Room.

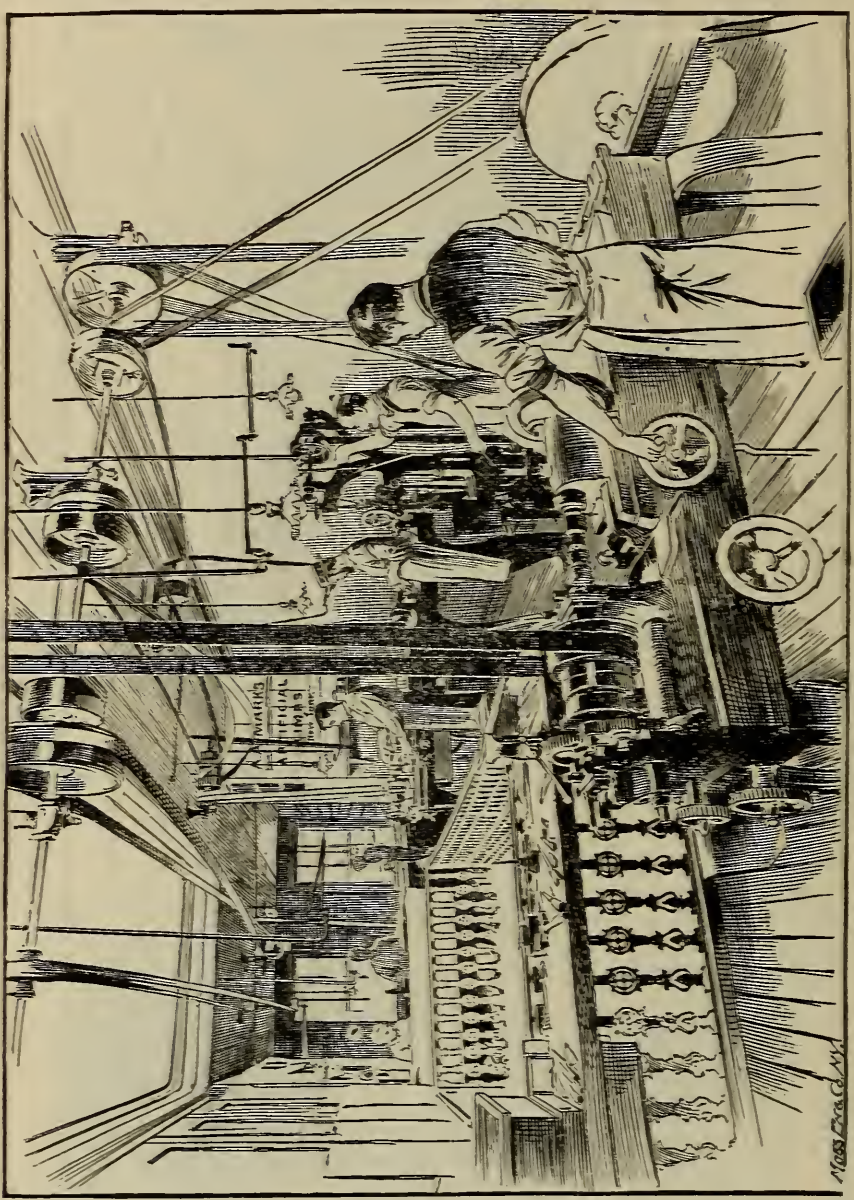
logs on his vehicle and carries them sometimes twenty miles to the mills at Sound Beach, Conn. Here the logs are trimmed on a buzz or circular saw; the heart, bark, and gnarly parts are removed and thrown away. The logs are then taken to the boring machine, where an augur of suitable size is driven through their centers. Natural crook logs, such as are used in natural crook legs, are trimmed on a



No. 1187.—West End of Machinery Department.

jig saw, the natural curve of the grain being carefully preserved. The timber is then placed in a kiln-dry, which is provided with steam pipes covering the floor, from which hundreds of smaller pipes arise vertically. The sticks, fresh from the mill, with holes bored through them longitudinally, are placed on these pipes, where they remain for several weeks under the heat of live steam. This ingenious kiln-dry was contrived by A. A. Marks, and is used exclusively by him. The

effect is to bring a uniform heat to the inside as well as the outside of each stick, thus avoiding checks by unequal seasoning. After the sap has thoroughly evaporated, which is ascertained by the weight, the sticks are taken to a cold, dry, dark storehouse, and there they remain for two or more years until they are thoroughly seasoned. They are then shipped to the factory, New York City, and worked into legs and



No. 1188.—East End of Machinery Department.

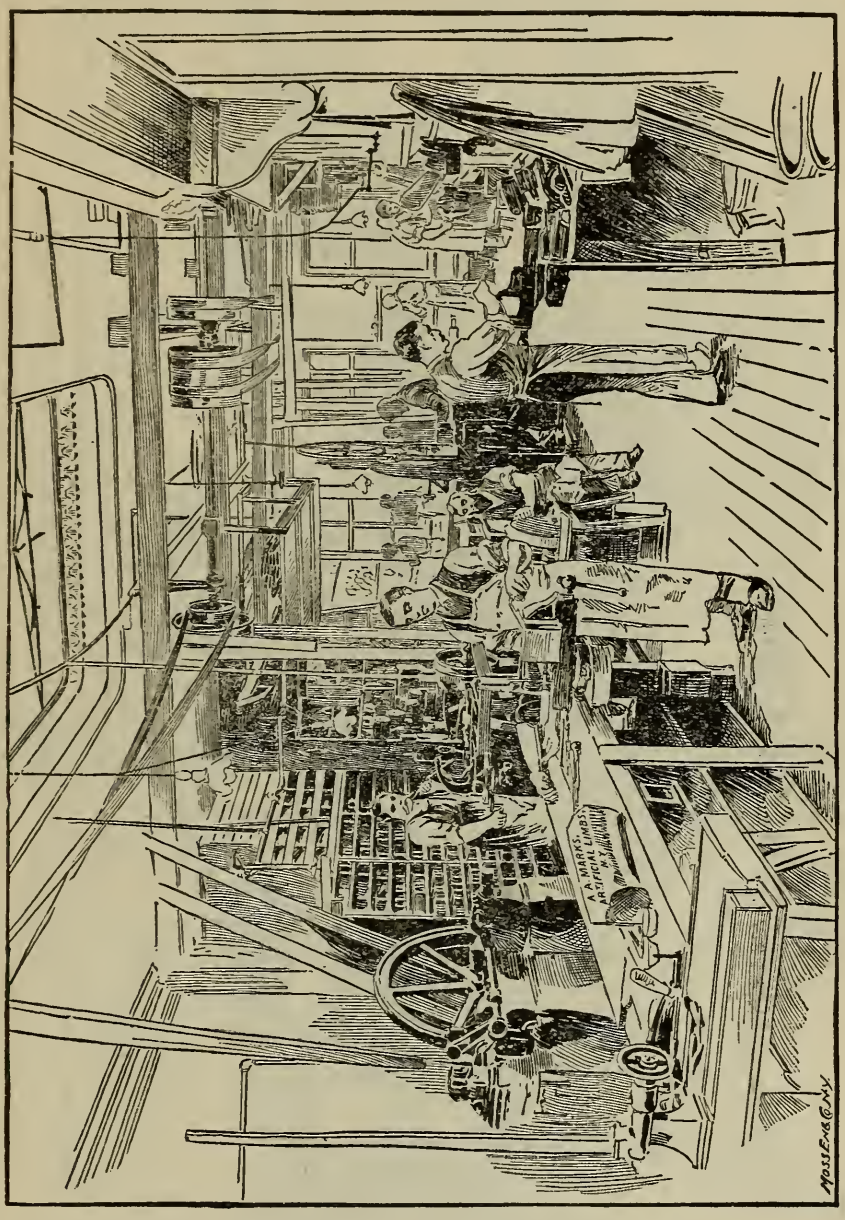
arms and sent to all parts of the world. This operation of obtaining timber occupies the greater part of every winter.

The New York shop is a veritable beehive. Passing into the upper hall, we find ourselves in the timber room, see cut No. 1185, where dry, ready timber is kept in stock.

Adjacent to this hall is the sock and supply room, cut No. 1186. Lamb knitting machines are operated here to meet the demand for cotton and woolen socks, which are worn on the patients' stumps.

Socks are made in any size or shape to conform to the shape of the stump. They are seamless and made of the best quality of material, either of cotton or wool, and of white or dark color.

In addition to socks this room is well stocked with webbings and suspenders, felt, buckles, oil cans, grease, and everything requisite for the wearing of artificial limbs.



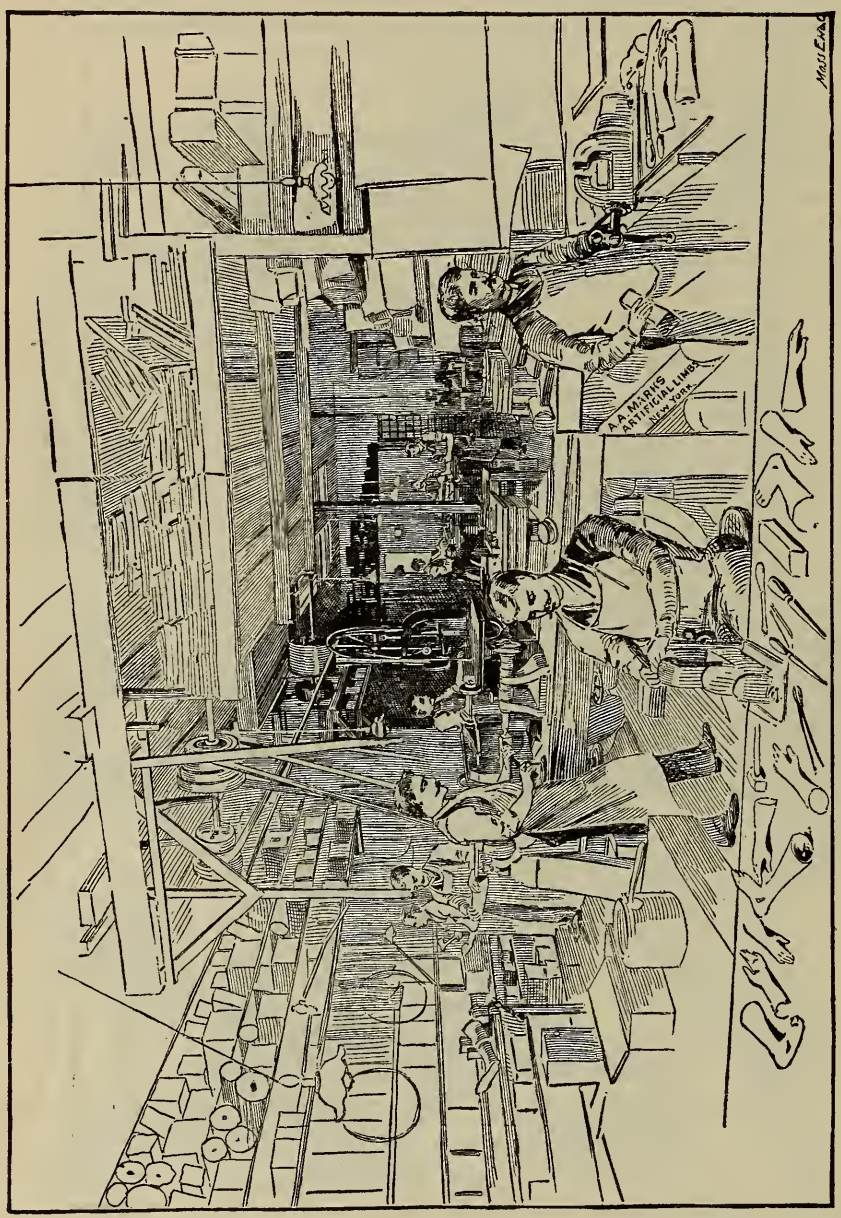
No. 1189.—Woodworking Department. Looking East.

The machinery department is well equipped with every requisite to facilitate the correct and rapid production of all the metal parts of an artificial limb.

Cut No. 1187 represents one of the divisions of this department. The man at the vise is finishing feet and hands to be used in mold making for vulcanizing rubber feet and hands; the man at the fire is heating metal to forge into desirable forms.

Cut No. 336 represents another view of the machine room. Here presses, lathes, and milling machines are under the management of skilled operators.

The wood shop is provided with band and circular saws, turning, boring, and hand lathes, buffing, grinding, facing, and mortising



No. 1190.—Woodworking Department, Looking West.

machines, all operated by power. Cut No. 1189 represents the shop, looking east.

Cut No. 1190 represents the wood shop, looking to the west. Although this department is well equipped with machinery, there can be but little machine work on an artificial limb. A log can have the rough corners sawn off and can be trimmed to an approximate shape and size, but it takes the experienced workman to carve it to the grace-

ful but irregular contours of the natural limb, every leg and arm being different in form, size, and character.

No. 1191.—Band Saw at Factory.

The eye, the brain, the hand, control the implements that shape the outside to match the opposite leg, or excavate the log to fit the stump.

No. 1192.—Carving Outside of Leg.

The connecting parts of the leg are mortised by a routing machine.

After the log has been fitted, shaped, and smoothed both inside

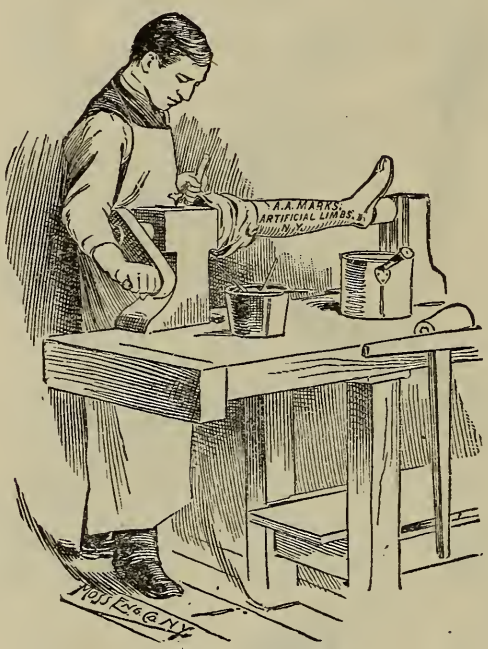
and outside, it is banded in order to increase its strength to resist internal pressure. The leg or arm now passes into the finishing room, where a rawhide covering is tightly stretched on the outside, and an enamel coating placed on the same.

The feet are covered with calfskin. During the drying process the limb is placed in a room heated to one hundred degrees, the enamel is baked, and made to be permanent.

The leg or arm receives its finishing touches in this department. It is taken from this room and applied to the person; or more likely packed in a box and sent by express to its distant wearer.

The fitting rooms are on a floor by themselves.

The office and showroom occupy the ground floor of the premises.



No. 1193.—Banding.

A large number of samples are on display, covering all the peculiar classes of limbs for every character of amputation.

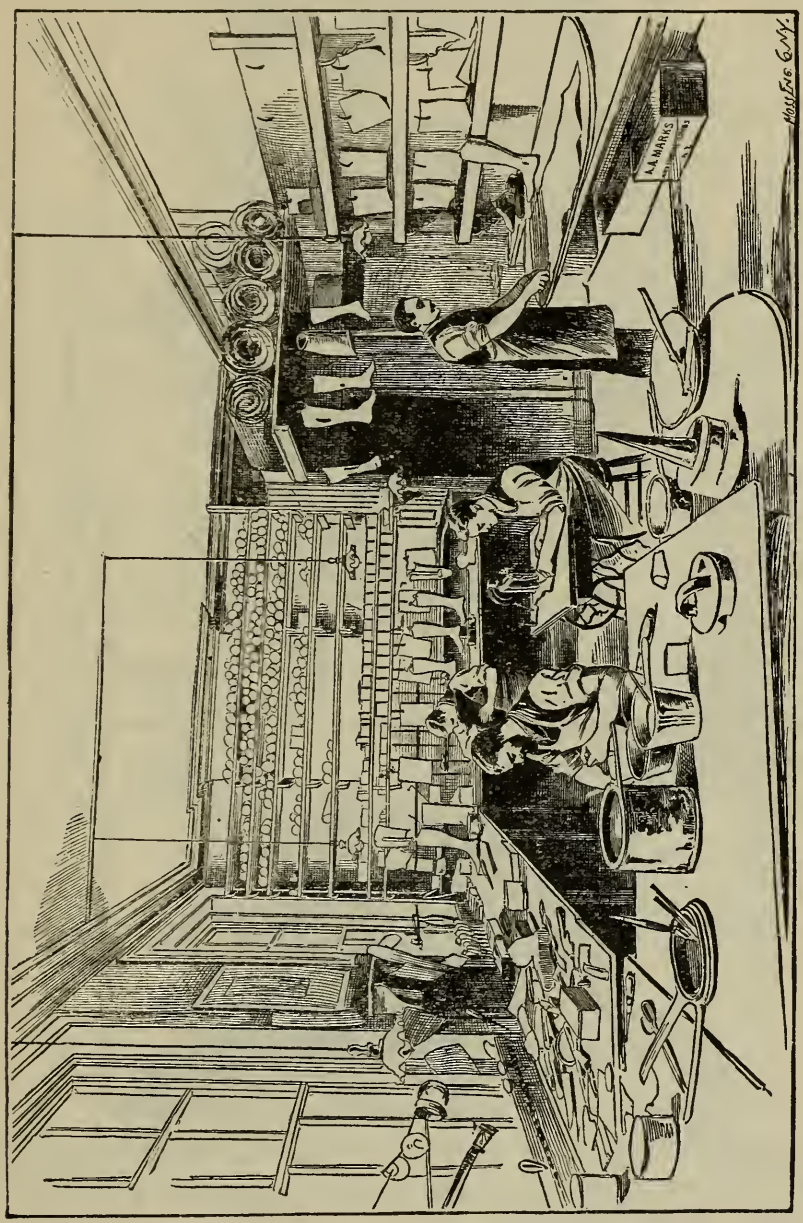
A part of the office is appropriated to escritorial work. Stenographers receive responses to letters by dictation, which average over a hundred a day. They are transcribed by typewriting machines in duplicate. Records of every inquiry are kept in order, and a perfect memorandum of every transaction made. The details of this office are multifarious, keeping nearly a dozen persons constantly busy. The office is equipped with every convenience to make a visitor feel at home, and to help him while away the time that would otherwise be tedious and weighty. When parties visit the establishment they are received cordially and made welcome to all its conveniences.

If they remain over night, they are escorted to hotels, boarding or lodging houses in the neighborhood.

A large fire-proof safe preserves all records, and at the same

time affords the visitor a place to deposit his valuables and money while he remains in the city.

Cut No. 1198 represents a transverse sectional view of our establishment which has a frontage of twenty-five feet, and occupies a lot one hundred feet deep. It consists of five floors, in addition to a basement and a sub-cellar. The sub-cellar is used for the storage of plaster molds,

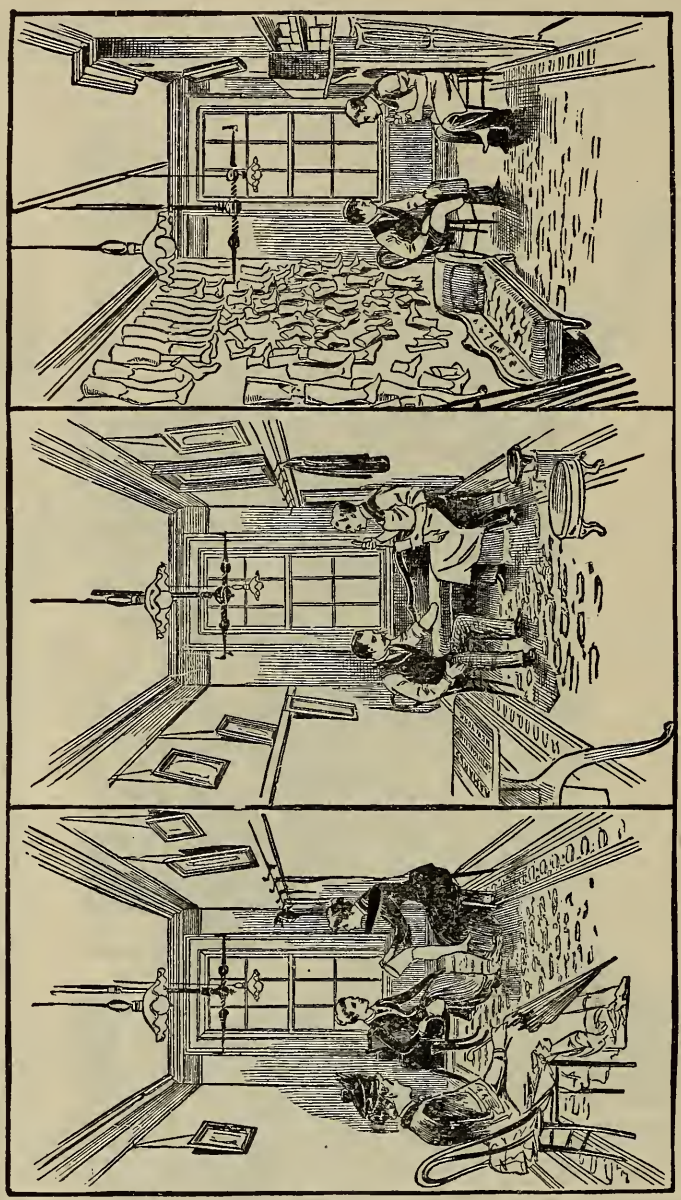


No. 1194.—Leather Department.

models, boxes, etc. The basement is used for packing and shipping artificial limbs and other goods, receiving stock and raw material.

The store is on a level with the sidewalk; it is fitted up as a show-room, reception room, and office; it also contains private rooms for measuring and fitting. The arrangement is such as to save patrons the necessity of climbing stairs. The second floor contains the finishing room and additional fitting and reception rooms; also a crutch depart-

ment. The third floor is entirely devoted to woodworking. The fourth floor contains the machinery, knitting, and stock departments. The fifth floor is used for the storage of timber, etc.



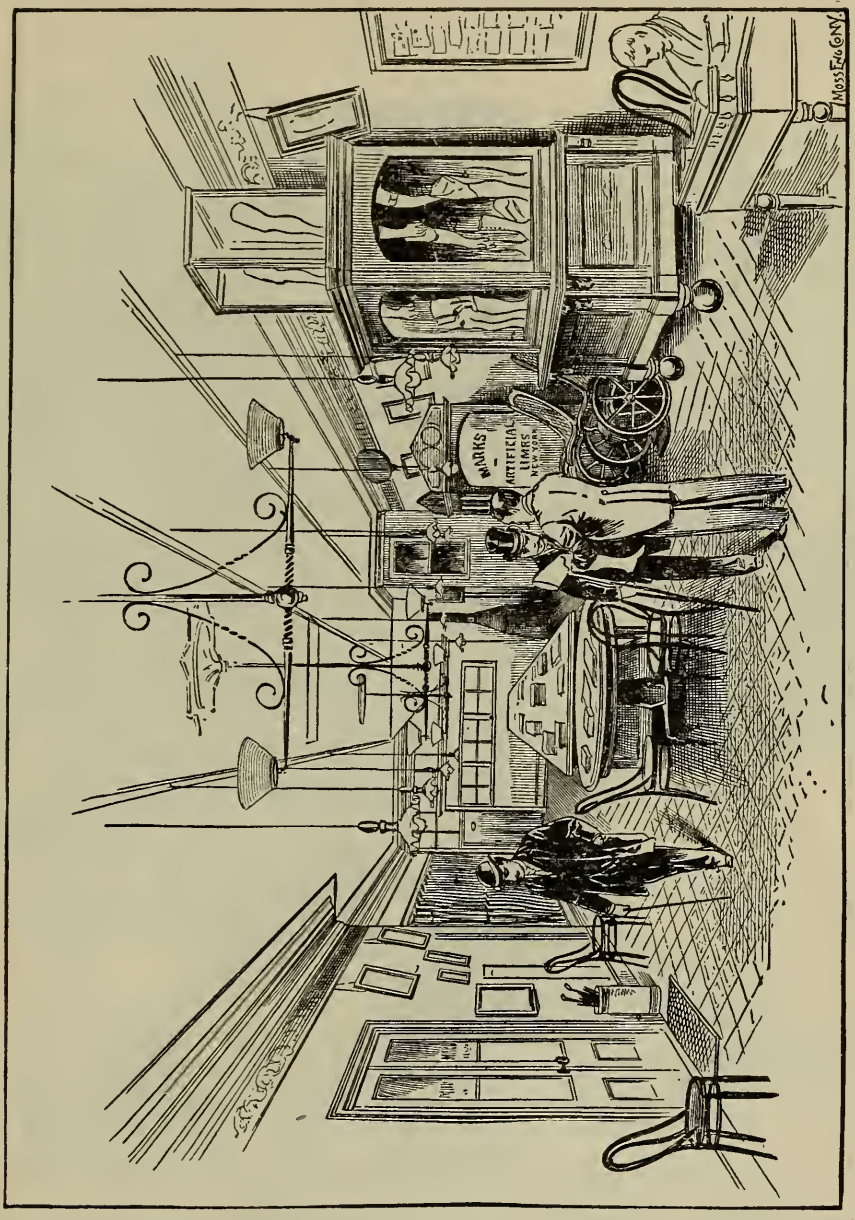
No. 1195.—A Set of Fitting Rooms—Private.

The following article, taken from the *Scientific American*, August 3, 1895, describes the process of artificial limb making in a way that is worthy of the reader's attention:

THE MANUFACTURE OF ARTIFICIAL LIMBS.

It would be hard to find a more beneficent example of the progress of mechanical science than that afforded by the peculiar industry we describe and illustrate in this issue. The artificial limb manufacturer ranks, in a sense, with the reparative surgeon in the good he does to humanity. Especially at the present day his operations are of impor-

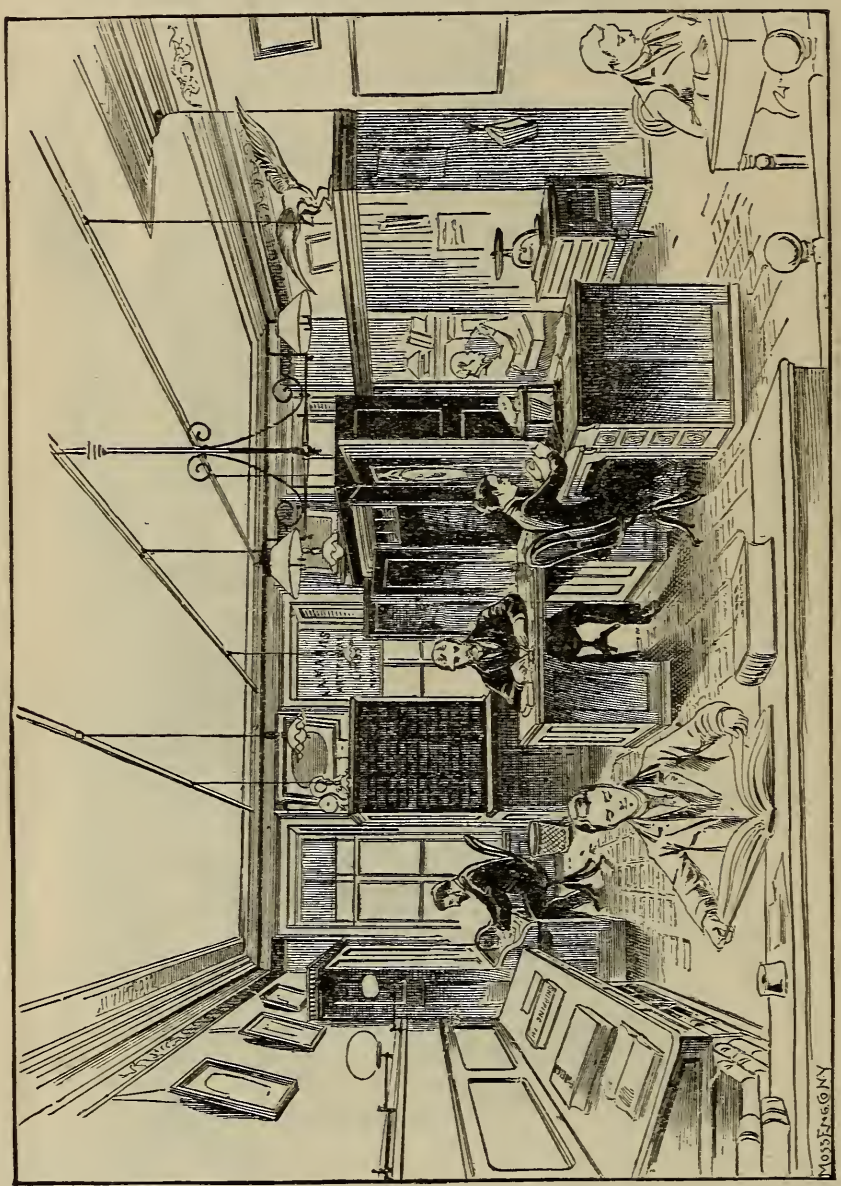
tance. The cases of amputation are getting more and more frequent. Trolley cars, steam railroads, agricultural machinery, and factories are all responsible for many accidents, and naturally they are increasing in number. In early days the old peg leg of the Peter Stuyvesant type represented the best substitute for the natural member. The hook of Captain Cuttle recalls the substitute for the other members in vogue some years ago.



No. 1196.—Show Room.

Manufacturers of these primitive affairs attempted to improve their products, and produced arms and legs with joints. The complicated natural leg was the model, and efforts were directed to reproduce its motions. Much ingenuity was expended in this direction, and in due course of time, through simplification of its parts, the structure, as has been aptly said, "passed through all the possible stages from the leg

automaton to the leg practical." The object of this article is to show how the artificial leg of the day is made, and our sketches have been made at the establishment of A. A. Marks, of New York City. A curious collection of envelopes is framed and displayed in the office of the firm—envelopes addressed to them and which inclosed correspondence from every country, and which would in many cases be treasures



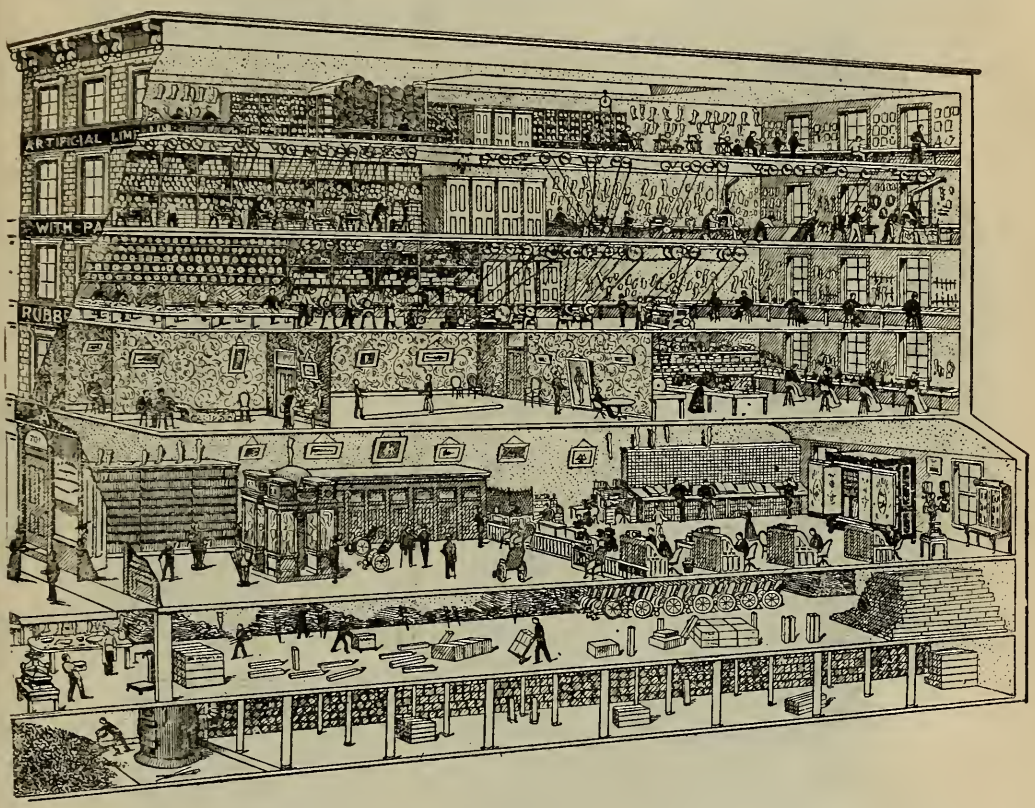
No. 1197.—Office.

to the philatelist. They are exhibited to show how the entire world draws upon their factory for artificial limbs.

The leg with restricted back and forward ankle motion was constructed by Mr. A. A. Marks during the interim 1853–1863. The joint included a spring adjustable for tension and provided compensation for wear. The experience of ten years showed that the ingenious and much praised ankle joint was too weak for hard service, and repairs

were very frequently required. A patient applied to Mr. Marks for a new foot without ankle joint. The idea, opposed to preconceived notions, was carried out with some difficulty, and the problem was practically solved. Now, except in very special cases, the ankle joint is definitely abandoned, and the India rubber foot, the result of a vast number of experiments, patented and controlled by this firm, is employed.

The first step in the process of leg making is the cutting of the timber. Two kinds of wood are used—the willow and the bass. These are



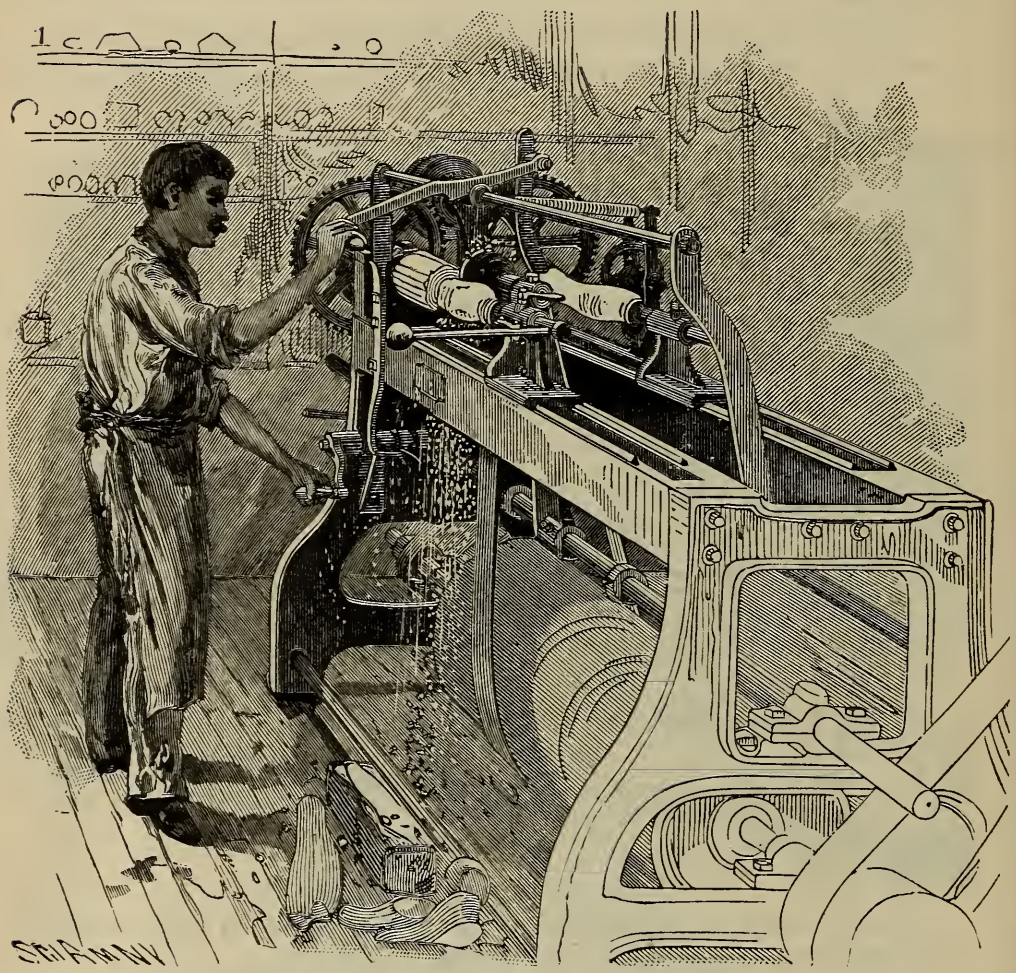
"The capacity represents an output larger than the aggregate of any other ten Artificial Limb Factories in the world."—*Scientific American.*

No. 1198.

felled with saws, are cut into short lengths, and an auger is driven through each log. The wood is kiln dried in live steam at a pressure of eighty pounds to the square inch. The endeavor in boring out the axis of the log is to provide for internal contraction, thus preventing checking. Several years' seasoning are given.

The seasoned wood, which has been roughed out with a buzz saw, is received in the factory and is ready for the workman. Fig. 6, *g*, Cut No. 1203, shows a log prepared for the shaping process. The workman has to give the interior a shape representing the contour of the stump on which the shape is based. With peculiar carving tools the interior is rapidly excavated until the approximate shape is reached. As guide or template for the interior, two pasteboard profiles (Fig. 6, *d*) of the stump are used, together with metal rings (Fig. 6, *e*),

giving the girth of the stump at different places. The exterior is brought to shape by the drawing knife for the first steps, followed by the gouge (Fig. 6, *b*), spoke shave, rasp, and sandpaper successively. The operation of carving the exterior of the leg is shown in one of the cuts, Cut No. 1201. The interior is brought to its final shape by revolving sand wheels, which smooth it out to precise contour. The



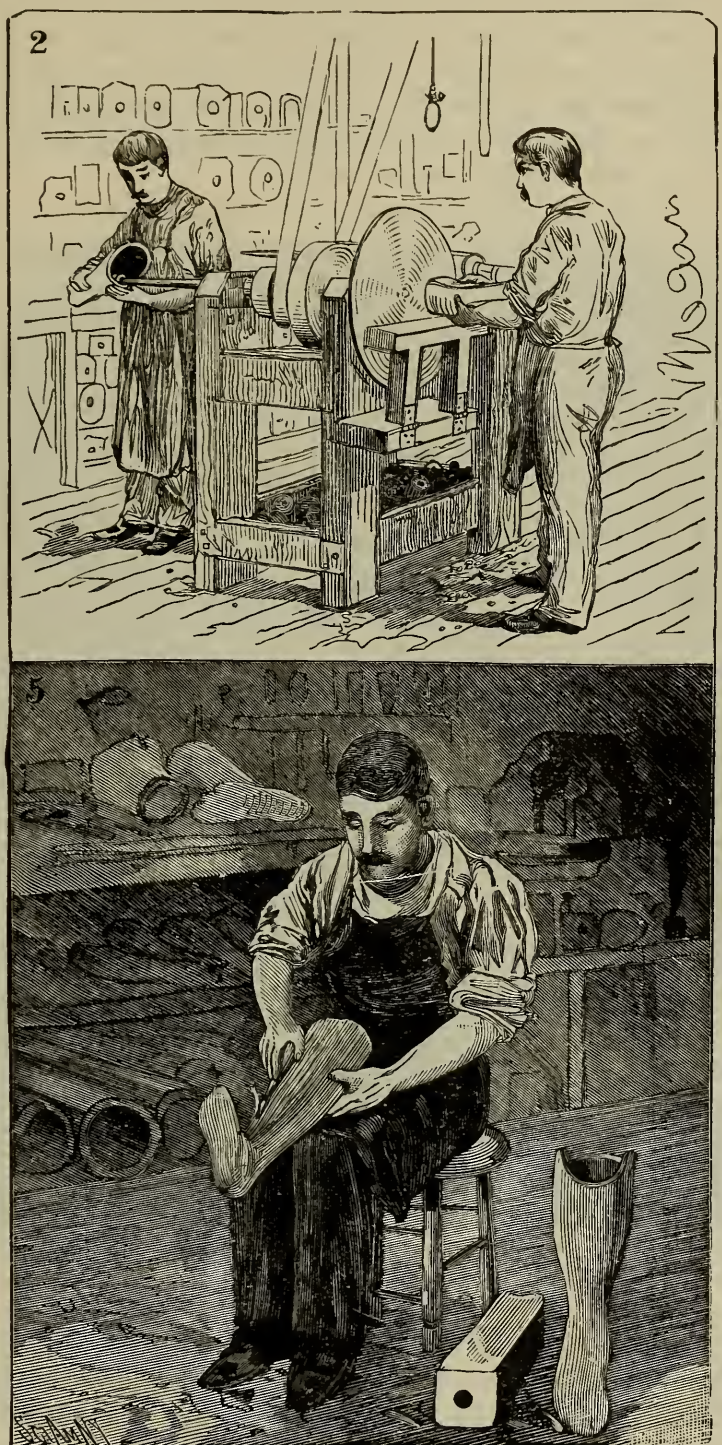
No. 1199.—Shaping Machine Turning Leg Section.

wheels, made of glue and sand on a core, are carried on the end of spindles rotated at high speed by power, and these are moved about against the interior of the leg until it is finished. Coarse and fine wheels are used. The operation is shown in Cut No. 1200, in which also is seen a workman facing off the end of the leg to receive the foot.

The foot is made upon a wooden core which extends down below the instep. The lower portion of the foot and the extension to the toes are made of sponge rubber, fortified with several layers of canvas embedded in the mass. The foot is rigidly secured to the ankle end of the lower limb by a sort of mortising. Sometimes the section of a log is turned out on a shaping machine from a template or duplicate, and one of the cuts, No. 1199, shows this machine in operation.

The leg is covered with rawhide tightly stretched over the outside of

the wood; the foot is covered with calfskin cemented on the upper surface and lapping over the sole. A sole is cemented on and is



No. 1200.—Finishing Interior of Leg and Facing off Ankle End.
No. 1201.—Carving Leg Sections by Hand.

sewed all around the edge to the upper covering. The foot and leg are now enameled and dried in an oven. This leaves them waterproof

for all ordinary purposes. These operations, one of which is shown in Cut No. 1203, are termed finishing.

But for special cases, where water is to be feared, a log is selected whose natural grain follows the curve of a leg and foot. From such a piece the entire lower leg and wooden core of a foot is made all in one piece, and the rubber portion of the foot is attached directly thereto. This makes an absolutely waterproof leg, which is adapted to those whose occupations expose them to wetting.

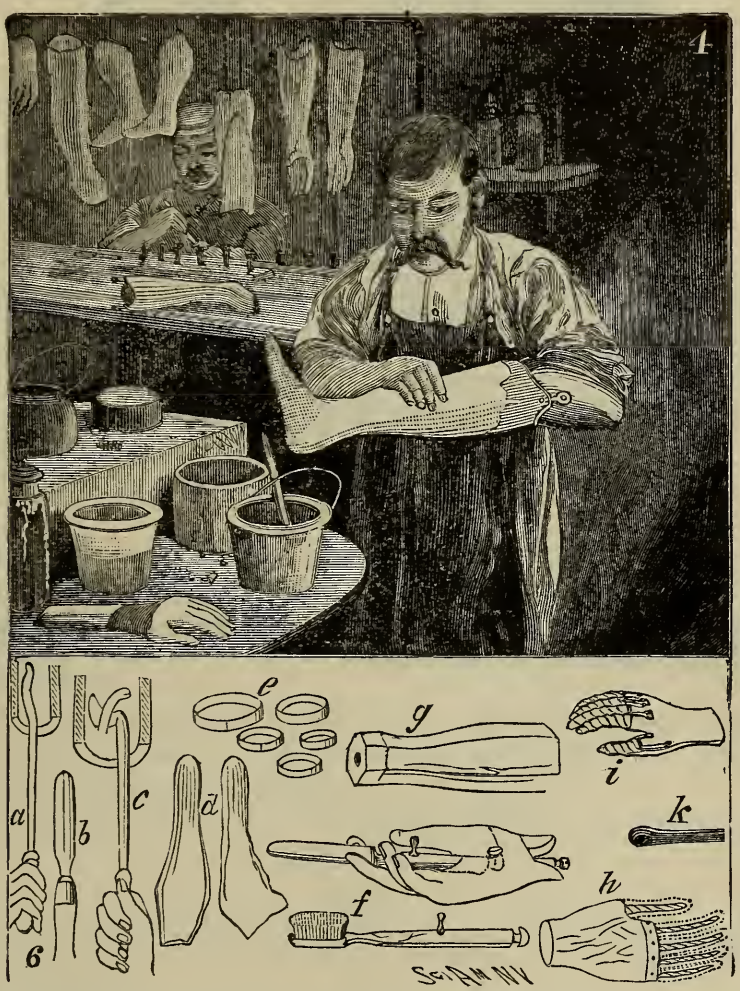
The knee joints are made in several ways, whose details cannot well

No. 1202.—Setting up Legs.

be gone into here. The operation of setting up the leg and connecting the knee joints is shown in Cut No. 1202. These joints have been, in some cases, constructed on principles adapted to the ideas of the wearers, where such seemed good practice. The elasticity of the foot, due to the depth of sponge rubber at the heel and to the long rubber toe, takes the place of the ankle joint.

Artificial arms are made in the same way. India-rubber hands are used instead of the old wooden ones. Sometimes a hand with malleable wire finger cores is employed. Holes are bored in the wooden

core of the hand into which the doubled ends of bundles of wire (Fig. 6, *k*) are inserted and pinned; *h* shows the hand thus far advanced. Tape wrapping is then applied until the fingers reach the proper size, shown in *i*, when all is ready for the coating of India rubber. This hand can have its fingers bent so that it can hold a pen or other light instrument. In Fig. 6, *f*, are shown a knife and brush adapted to be inserted in a socket in the hand. The small projecting handle is used to insert them with.

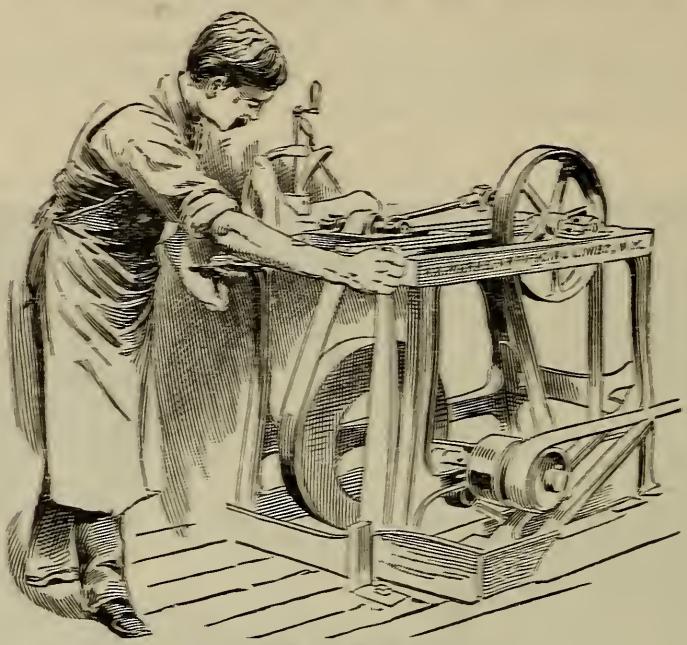


No. 1203.—Finishing Legs and Arms.—Details and Parts of Artificial Limb Making.

The beneficent results of this work have been mentioned. In the Marks factory is a workman with two wooden legs. He does a full day's work standing at his bench, and then will often play billiards all the evening. It is impossible to believe that he depends altogether on artificial limbs. Tight rope walking, hurdle jumping, and other apparently impossible feats are performed by wearers of the Marks limbs. As a mechanical process the operation of wooden leg making

is most interesting, and the limits of this article preclude a full description.

The noise of machinery, the humming of wheels, the buzzing of saws, and the many men stationed at their benches show that the



No. 1204.—Mortising.

industry is of far greater magnitude than anyone would suppose. There are over forty employees in this establishment, and the capacity represents an output larger than the aggregate of any other ten artificial limb factories in the world.

AWARDS.

The first industrial exhibition at which Mr. Marks exhibited his artificial limbs was at the Crystal Palace in New York City in 1858. As that exhibition was destroyed by fire during its progress no awards were given.

1859.

The American Institute in New York City held an exhibition in the fall of 1859. The silver medal was awarded to A. A. Marks for his superior artificial limbs. This was prior to the invention of the rubber foot, and consequently had no reference to it.

1865.

AMERICAN INSTITUTE, NEW YORK, GOLD MEDAL.

Judges' Report:

After a careful and extended examination and practical testing of the various kinds of limbs on exhibition, we award the First Premium Gold Medal to artificial limbs with rubber hands and feet.

J. M. CARNOCHAN, M. D., J. C. V. SMITH, M. D., JAMES KNIGHT, M. D.

1867.

AMERICAN INSTITUTE, NEW YORK, FIRST PREMIUM.

Judges' Report:

Marks' Patent Artificial Limbs have frequently been before the Institute and continue to sustain their former reputation. The First Premium is consequently awarded.

A. K. GARDNER, M. D., J. C. V. SMITH, M. D., J. J. CRAVEN, M. D.

1869.

AMERICAN INSTITUTE, NEW YORK, FIRST PREMIUM.

Judges' Report:

Artificial Limbs, A. A. Mark's Best. This limb is constructed with an india-rubber foot, which, from its elasticity, does away with the necessity of motion at the ankle joint, and also obviates entirely that *heavy, thumping sound* when the foot strikes the ground in walking, an objection which exists in *all other* artificial legs which the committee have any knowledge of.

The control which the wearer has over it and its movements, so closely resembling those of the natural limb, as well as the small cost of keeping it in repair (almost nothing), entitle it to the highest commendation.

LEWIS A. SAYRE, M. D., JAS. R. MCGREGOR, M. D., Judges.

1870.

AMERICAN INSTITUTE, NEW YORK, FIRST PREMIUM.

Judges' Report:
Marks' Artificial Limbs.

BEST.

The especial point of excellence appears to us to be the india-rubber foot, by the use of which all complications in the construction of an ankle joint are avoided.

FRANK H. HAMILTON, M. D., HARVEY S. GAY, M. D., WM. H. VAN BUREN, M. D., Judges.

1871.

AMERICAN INSTITUTE, NEW YORK, FIRST PREMIUM.

Judges' Report:

The artificial limbs with india-rubber feet are especially recommended for their simplicity, durability, and easy movement. Signed by the Judges.

1872.

AMERICAN INSTITUTE, NEW YORK, FIRST PREMIUM.

The artificial limbs manufactured by Mr. Marks continue to merit approval, and are entitled to *all* the confidence the public have to this time reposed in them.

JOHN OSBORN, M. D., HARVEY S. GAY, M. D., FRANK H. HAMILTON, M. D., Judges.

1873.

AMERICAN INSTITUTE, NEW YORK, FIRST PREMIUM.

Report of Judges:

After full and impartial examination of the articles above described, the undersigned Judges make report that they find the artificial limbs on exhibition by A. A. Marks worthy of the confidence heretofore reposed in them. We cheerfully endorse all that has been said of them by former examinations, *their simple construction, easy movements, durability, etc.*

JOHN OSBORN, M. D., D. F. FETTER, M. D., C. D. VARLEY, M. D.

1874.

AMERICAN INSTITUTE, NEW YORK, FIRST PREMIUM.

Report of Judges:

We consider the artificial limbs of A. A. Marks of great value.

A great improvement—better than any known to us; and of their grade entitled to the *highest award.*

A silver medal awarded in 1873, as the *best;* a diploma of *maintained superiority* is now awarded.

V. P. GIBNEY, M. D., H. B. SANDS, M. D., E. G. JANEWAY, M. D., Judges.

1875.

AMERICAN INSTITUTE, NEW YORK CITY, FIRST PREMIUM.

Judges' Report:

After a full and impartial examination of the articles above described, the undersigned Judges make report that the artificial limbs presented by Mr. Marks are the same as those offered by him at former exhibitions. We regard them as *superior to all others* in *practical efficiency* and *simplicity*, and would respectfully recommend the award of a diploma of *maintained superiority.*

FRANCIS A. THOMAS, M. D., CHARLES W. PACKARD, M. D., J. R. MCGREGOR, M. D., Judges.

1876.

CENTENNIAL EXHIBITION, PHILADELPHIA, PA., FIRST PREMIUM.

Report of Judges and award of the Commission:

International Exhibition, Philadelphia, 1876.

The United States Centennial Commission has examined the report of the Judges, and accepted the following reasons, and decreed award in conformity therewith.

REPORT OF AWARDS.

Products: Artificial Limbs, with Rubber Hands and Feet, invented by A. A. MARKS, New York.

The undersigned, having examined the product herein described, respectfully recommends the same to the United States Centennial Commission for award, for the following reasons, viz.: UTILITY, WORKMANSHIP, and ADAPTATION TO PURPOSE INTENDED.

HENRY H. SMITH, Professor of Surgery.

Approval of Group Judges. H. K. OLIVER, EDWARD CONLEY, B. F. BRITTON, SPENCER F. BAIRD, CHAS. STAPLES, JR., M. WILKINS, J. FRITZ, JAS. L. CLAGHORN, COLMAN SELLERS.

A true copy of the record.

FRANCIS A. WALKER, Chief of the Bureau of Awards.

Given by authority of the United States Centennial Commission.

A. T. GOSHORN, Director-General.

J. L. CAMPBELL, Secretary. J. R. HAWLEY, President.

1876.

AMERICAN INSTITUTE, NEW YORK, SPECIAL GOLD MEDAL.

Judges' Report:

We consider the limbs made by A. A. Marks remarkable for simplicity of construction, durability, efficiency, and comfort to the wearer.

We think them entitled to the highest commendations, and believe that their merits call for an award of the Centennial Medal.

FRANCIS A. THOMAS, M. D., CHARLES W. PACKARD, M. D., J. R. MCGREGOR, M. D., Judges.

1877.

AMERICAN INSTITUTE, NEW YORK, MEDAL FOR SUPERIORITY.

Judges' Report:

A. A. Marks.—After a full and impartial examination of the articles above described, the undersigned Judges make report that we consider this exhibit of great value and entitled to recognition.

CHARLES W. PACKARD, M. D., FRANCIS A. THOMAS, M. D., AUGUST VIELE, M. D., Judges.

1878.

AMERICAN INSTITUTE, NEW YORK, MAINTAINED SUPERIORITY.

Having received the Medal of Superiority in 1877, this DIPLOMA FOR MAINTAINED SUPERIORITY is awarded to him at the Exhibition of 1878.

NATHAN C. ELY, President.
G. K. MCLEOSER, Recording Secretary.

1881.

INTERNATIONAL COTTON EXPOSITION, ATLANTA, GA., FIRST PREMIUM, GOLD MEDAL.

Judges' Report.

The undersigned having examined the artificial limbs of A. A. Marks of New York, respectfully recommend the same to the Executive Committee of the International Cotton Exposition for the following reasons, viz.:

First. Simplicity in the mechanism of the knee-joint and for its excellent movement.

Second. Durability.

Third. Rubber Foot, possessing many excellent qualities and compensating for the absence of motion in the ankle joint.

We recommend that a gold medal be awarded.

Approval of Group Judges, CHAS. L. WILSON, M. D., AMOS FOX.

Approved, H. I. KIMBALL, Director-General.

1885.

THE WORLD'S INDUSTRIAL AND COTTON CENTENNIAL EXHIBITION, NEW ORLEANS, LA., GOLD MEDAL.

Artificial Limbs.

Jurors in the above entitled class having carefully examined the exhibit made by A. A. Marks, New York, and all competing exhibits, concur in recommending the award of the First Class Medal for Artificial Limbs.

S. D. Carroll,
For Department of Awards.

1889.

THE JOHN SCOTT LEGACY PREMIUM AND MEDAL.

John Scott, chemist, late of Edinburgh, by his will made in the year 1816, bequeathed a sum of money to the Corporation of the City of Philadelphia, directing that the interest and dividends received therefrom shall be laid out in premiums, to be distributed among ingenious men and women who make useful inventions, and that therewith shall be given a medal with this inscription:

"To The Most Deserving."

REPORT OF THE COMMITTEE ON SCIENCE AND THE ARTS OF THE FRANKLIN INSTITUTE, ON MARKS' ARTIFICIAL LIMBS.

This subject was submitted to the Committee on Science and the Arts for examination, and upon the reading of the report and exhibiting the specimens and illustrations, appeared to be of sufficient interest to warrant the attention of the Institute at this meeting, and a concise abstract of the report was accordingly prepared. This abstract follows and describes the inventions in their several stages of progress.

The first improvement consisted in the substitution of an elastic artificial foot, made of india-rubber, without any joints whatever, for the artificial foot, previously made of wood, with joints to permit motion of the ankle and toes, and also an artificial hand made of india-rubber, simulating the missing member.

The rubber foot consists of a wooden block rigidly secured or formed with the leg and extending downwardly to within about two-fifths of the distance from the ankle to the sole, and forward to nearly the first articulation of the metatarsus and toes; this block was covered with india-rubber, and all the rest of the foot, from heel to toes, was formed of elastic vulcanized rubber.

The action of such an artificial foot was that of an elastic segment of a wheel. The shock of placing the weight upon the heel at each step was avoided by the elastic cushion of rubber forming the heel, and as the weight was progressively transmitted to the forward part of the foot, by the combined effect of muscular exertion in the remaining part

of the natural limb to which it was applied, and the momentum previously acquired, an easy flexure of the toes took place, which, reacting elastically as the weight was transferred to the other limb, assisted in the flexure of the knee-joint, giving an easy and naturally appearing movement. Such artificial feet were, upon trial by those who were maimed and had used other artificial substitutes, found to be easier to use, lighter, and more comfortable. They were rapidly introduced into use, and have proved, from their greater simplicity, more durable and far less destructive to clothing.

The next improvement is an improved and simplified construction of the knee joint of artificial limbs, made with a view to strength, facility of accurate manufacture, and easy application. This joint consists of a flanged plate, secured by screws to the under surface of the thigh-socket, and has formed, integrally with it, of steel, by drop forging, a cylindrical pillar, terminating in two lateral journals having the same axis, resembling an inverted capital letter T.

These journals perform the function of the condyles of the femur in the natural limb, and are fitted accurately in bearings formed with oblique caps, secured by screws in the rear of the knee portion of the leg.

On the rear of the pillar, in about the same horizontal plane as the axis of the journal when the limb is extended, is formed a short lever, having a spherical end, against which a cup, formed upon the upper end of a sliding plunger, is pressed upwardly by a spring in a guiding cylindrical case, having a conical lower end resting in a correspondingly shaped cup in the interior of the calf portion of the leg. When the limb is extended, the spring operates with full effect, in holding the limb extended: as it is flexed, the lever gradually assumes a greater angle to the line of reaction of the spring and cup, so that when it is flexed with the thigh at right angles with the leg the spring has no motion or effect, and if flexed still further the spring then operates to assist in further flexure. The pillar and journals are made hollow, so as to reduce their weight.

It is obvious to every mechanic, that from the shape of these parts they must possess great strength, and that they can easily be fitted into their working positions.

Another useful feature of this form of joint is that the upper part of the pillar forms an effective stop, to arrest the forward motion of the thigh upon the leg during extension, by coming in contact with a cushioned cavity in the rear of the knee: this point of support, being at a considerable distance from the axis of the knee-joint, avoids any severe strain and shock from the sudden extension of the limb, which in other constructions, having the stops made in plates at the sides of the joint, are necessarily close to the axis of motion, and consequently are subjected to a greatly increased strain.

This concussion of the stop is found to be a frequent cause of breaking both of the stops and joints, of other forms of limbs, and has had a great deal of ingenuity expended upon it to avoid it, by providing check straps or cords, reaching from the thigh to the leg, and designed

to stretch tight before contact of the stops occurs. These cords required greater care to keep adjusted to the proper tension than could readily be given to them. The simple contrivance, here shown, obviates the entire difficulty.

The axis of the knee-joint is placed near the back of the limb, so that the weight of the wearer ensures a firm support on the limb when extended, and at the same time slight exertion suffices to move the limb in stepping forward.

The shell, or parts which in form imitate the natural limb, are made of light willow or bass wood, as thin as is consistent with strength in the lower part, and in the upper part excavated to fit the remaining portion of the natural limb; these are covered tightly with parchment and painted and varnished to resemble the complexion of the natural skin.

The continued use of the limbs thus constructed demonstrated that the front portion of the foot was too easily flexible, or rather that greater elastic force was desirable, and this requirement was met by the inventor by a device in which a textile fabric was introduced between the lamina of india-rubber forming the ball and toe portion of the foot, as here shown in the drawing.

The desire to adapt the india-rubber hands to changes of flexure, for purposes of better and more natural appearance and to grasp light objects, led Mr. Marks to improve them by making a light wooden core in the palm or metacarpal portion of the hand and inserting ductile or flexible metallic wires in such core, which extended centrally through the fingers. By bending the fingers they retain the form in which they are set. The test of several years' use of these last-named improvements has proved their desirability.

The latest improvements in artificial limbs consists in forming the leg and foot part of a single piece of wood, having the grain curved naturally in its growth, such pieces being procured from the parts of the trunk contiguous to the roots and branches of trees; limbs made in this way are stronger with the same amount of wood remaining in them than when made of parts and glued together, and are made waterproof, which is a valuable feature when the occupation of the wearer exposes it to constant dampness, or to water itself, as in fishing, mining, dredging, etc.

By making limbs in this manner from natural curves in the growth of the wood, it has become practicable to make light and substantial artificial feet, adapted to partial amputation of the foot. Such appliances are shown herewith, and have been used with unprecedented satisfaction where articulated feet were clearly impossibilities.

The advantages derived from the lightness of such artificial substitutes will readily be apparent when the resistance to motion from inertia is considered. The ankle and foot and lower part of the limb, being light and hollow, move easily and promptly with but little exertion from the remaining part of the natural limb, and the comfort and ease of the wearer are thereby greatly promoted.

With the specimens of limbs are submitted well-perfected adjuncts

in the way of suspender straps and girdles, and great ingenuity and skill have been displayed by these inventors in adapting limbs to specific cases which, while useful and light and highly commendable, cannot be particularized in this report.

The FRANKLIN INSTITUTE has not made any examination in this department of the arts since January 11, 1849, when, as appears on page 61, vol. xlix., of the *Journal*, they reported upon the merits of the Palmer artificial limbs. Since that time about sixty or more patents have been granted for alleged improvements in artificial limbs, nearly all of which, except these which are the subject of this report, added complications or additional parts to the limbs. In none of those inventions does there appear such desirable simplicity of construction as in those under consideration. The makers are enabled to make most durable and substantial workmanship of all parts, and have demonstrated all of these points by making many thousand which are in constant and satisfactory use.

The extreme simplicity of construction has proved the means of bringing their cost within the reach of many persons requiring such appliances, who could not otherwise afford to use and maintain them, and there are now many persons using them and actively competing with others in many lines of industry, among them machinists, blacksmiths, farmers, fishermen, carpenters, molders, instrument makers, railway conductors, engineers, and, in fact, representatives of nearly every handicraft.

Mr. Thomas Kehr, a skilled workman in all branches of their manufacture, who works daily at the bench, standing upon two of them, demonstrated publicly at the Institute meeting the facility of use and value in walking better than anything that can be said upon the subject. (One of Mr. Kehr's legs was amputated in the middle of the femur and the other an inch and one-half below the patella.)

[The report of which the foregoing is an extract, and which embraced the recommendation of the award of the John Scott Legacy Medal and Premium, was signed by S. Lloyd Wiegand (*Chm.*), L. L. Cheney, and N. H. Edgerton, and approved and adopted by the Committee on Science and the Arts, at its stated meeting, held Wednesday, February 6, 1889.]

The above report was presented to the committee appointed by the City of Philadelphia, under the auspices of the Franklin Institute, and it was unanimously decided that the John Scott Legacy Medal and Premium should be awarded to A. A. Marks for the merits contained in his artificial limbs. The house of A. A. Marks thereby being designated as:

THE MOST DESERVING.

1891.

AUGUSTA EXPOSITION, AUGUSTA, GA.

Seven Gold Medals and Awards for distinct and separate features of excellence.

First. For Improved Artificial Legs with Rubber Feet.

Second. For Improved Artificial Arms with Rubber Hands.

Third. For Superior Methods of Suspenders for Artificial Legs and Arms.

Fourth. For Superior Crutches and other Auxiliaries for Cripples.

Fifth. For a Combined Knife and Fork for the use of one-armed men.

Sixth. For Improved Waterproof Artificial Legs, carved from natural crook timber.

Seventh. For Improved Artificial Legs and Arms with Aluminum Sockets.

The reports of the Judges on each of the above awards were signed by the following:

THOS. R. WRIGHT, M. D.,
E. C. GOODRICH, M. D.,
W. H. DOUGHTY, Jr., M. D.,
} Surgeons in Charge.
S. LESSER,
JNO. W. CLARK,
R. M. SIMS,
} Judges.
E. J. O'CONNOR, M. D.,
Committee of Awards.

1893.

The Elliott Cressons Gold Medal, awarded to A. A. Marks for aluminum socket artificial legs and arms, as stated in the following report:

THE COMMITTEE ON SCIENCE AND THE ARTS OF THE FRANKLIN INSTITUTE.

SUBJECT.—MARKS' IMPROVEMENTS ON ARTIFICIAL LIMBS.

At the stated meeting of the committee on Science and the Arts of the Franklin Institute, held February 1, 1893, the following report was adopted and ordered to be issued over the signature of the Chairman and the certification of the Secretary, viz.:

This invention consists of an improved method of making artificial limbs, adapted to amputations in the ankle, or below, in the tarsus or metatarsus, in which the former modes of construction, with articulated ankle-joints of wood as the material, were impracticable and unsatisfactory in result; although sometimes made when wood was employed as a material, these were always clumsy, and when the articulated ankle was attempted, it proved inoperative. The new method of construction involves the use of aluminum as the material to form the shell socket or sustaining frame, as it might be called, the aluminum shell supporting the body, and forming the attachment for the elastic rubber foot, which acts as a rolling elastic segment simulat-

ing the functions of the natural foot in walking, and acting as an elastic cushion in relieving the wearer from the jar or shock of resting the weight upon the limb. At the same time they resemble the form of the natural foot more closely than was possible with previous constructions.

The invention is described and set forth in United States Letters Patent No. 470,431, dated March 8, 1892.

The specimen submitted to the committee shows the invention to be extremely light, and so compact as to make no noticeable enlargement of the artificial foot beyond the size of the natural foot, thus completely restoring the appearances.

Your committee has examined the limbs in the course of manufacture, and as completed and as in use by wearers. When clothed, they give no indication in walking that they are not natural feet.

The mode of making the aluminum shells consists in first producing a plaster cast of the mutilated member to which it is to be applied. Upon this plaster cast is fitted a pattern carved in the usual manner, and prepared for the founder. The aluminum shell is then cast from this pattern.

The limb embraces four elements: First of these is the metallic shell or frame; its functions are to receive the weight of the wearer at its upper part, and transmit it to the foot.

The second is the removable elastic foot: this is so proportioned in thickness in its several parts as to hold securely on the lower portion of the frame and to act as an elastic cushion in receiving the weight upon the heel and transfer it as the step progresses to the ball of the foot and toes, which, under the pressure, flex, and again extend as they are relieved of weight, thus closely imitating the action of the natural foot.

The third element in the structure is the leather jacket, which confines the limb in the metallic shell or frame so that the weight is received on the upper portion.

This jacket of leather is attached to the shell by a few rivets, which can easily be removed and a new leather expeditiously substituted at small cost by any saddler or other leather worker without entailing the delay of sending the limb to the original manufacturers.

The fourth and last element is the pad in the base of the cavity of the aluminum shell or frame; the pad is made of cork in the specimen submitted, and covered with felt on the upper surface; a pad of wool or any other similar substance could be substituted with like effect; the cork has the advantage of being light, and is easily removed, cleaned, and replaced.

The combinations of these parts forms a limb which, with inexpensive repairs, easily procurable with little delay, has almost unlimited durability and affords a much needed relief to many who heretofore were dependent upon crutches for aid in locomotion.

The invention, regarded from a humanitarian standpoint, is of great importance. Although it was less than two years from the making of the first specimens at the time this invention was shown at the Insti-

tute and referred by resolution to the committee for examination, yet 134 at that time had been brought into practical use, as appears from an inspection of the books and correspondence of the manufacturers, and all of them found to be satisfactory in performance.

Such a practical indorsement from the users, and those only fully qualified to test the merit of this class of inventions, is indicative of the great merit and suggestive of the extended field of usefulness of the invention.

The following, from the impression of the *New York Medical Journal* of April 16, 1892, sets forth better the importance of the invention from a humanitarian standpoint, as viewed by surgeons, than your committee feel competent to express in any other terms:

"There are amputations of the lower limbs that surgeons deem desirable to do without sacrificing more of the member than the parts involved. We refer to amputations technically termed tibio-tarsal, tarso-metatarsal, and medio-tarsal. These amputations have always been in disfavor with artificial limb makers, who have almost unanimously decried them, and in too many instances have persuaded the surgeons to sacrifice much of a healthy leg merely to obtain a stump that would better accommodate the artificial limbs that they were able to produce.

"The new artificial leg, constructed of aluminum combined with the rubber foot, is adapted to these amputations. The socket of aluminum encases the stump, and on account of the strength of the metal the socket does not increase the diameters of the ankle to an objectionable degree in order to obtain the requisite strength. The metal is cast into the proper shape to give ease and comfort to the wearer; the aluminum socket is terminated by a rubber foot, which not only simulates the natural foot, but provides a soft, springy medium to walk upon, and a resident phalangeal ball to rise upon while walking, running, or ascending stairs.

"It is obvious that by this invention the amputation can be conditioned upon the injury and the artificial limb conditional upon the amputation. In this alone the invention of the aluminum and rubber leg will prove not only a boon to the one who has suffered the amputation, but the solution of a problem that has many times perplexed the operating surgeon, as it eliminates all the objections heretofore pressed against amputations in the region of the tarsus. The surgeon may thus rejoice in being able to observe the old and consistent law of amputating with the least sacrifice."

It is, therefore, clearly apparent that the invention is one affording much-needed relief to persons heretofore greatly embarrassed, and further that the surgeons may save much more of the patient's body from mutilation than heretofore, and yet render comfortable and satisfactory artificial limbs practicable.

In view of these points of excellence and well-attested evidence thereof the committee awards the Elliott Cresson Medal to Mr. Marks, of New York, for his improvements in artificial limbs.

Adopted February 1, 1893.

H. R. Heyl,
Chairman Committee on Science and Arts.

Certified as a correct copy.

W. H. Wahl, *Secretary.*

HIGHEST AWARD, WORLD'S COLUMBIAN EXPOSITION, CHICAGO, ILL., 1893.

The display of artificial limbs in this memorable Exposition must be regarded as the most extensive and varied ever brought together under the same roof. Nine different manufacturers were here collected in active competition with each other.

No. 1205.

The space allotted to A. A. Marks covered an area of one hundred and eighty square feet. On this space were placed four large show cases, roofed by a gilded dome, and surmounted by a colossal golden leg.

The cases contained artificial legs and arms for amputations in the

hips, thighs, knees, legs, ankles, feet, shoulders, arms, elbows, forearms, wrists, hands, and fingers, also apparatus for extending shortened legs, for supporting weakened knees and ankles, and for the correction of deformities. They comprised over fifty specimens.

The exhibit was attended by a medical student, who wore an artificial leg for amputation above the knee; and two assistants, who wore pairs of artificial legs with rubber feet.

Literature printed in English, Spanish, French, and German was liberally distributed.

The Judges appointed to investigate artificial limbs were more than usually searching and scrupulous. The following points on which we claim excellence were considered by the Judges:

ARTIFICIAL LEGS.

First.—RUBBER FOOT. (*a*) Its close approximation to the motions and actions of the natural foot, when standing, walking, running, ascending or descending steps, elevations in grounds, etc.

(*b*) Its durability and lightness; the yielding and elastic qualities of rubber supply requisite motion without necessitating mechanism; the absence of this mechanism admits of strength and lightness.

(*c*) Phalangeal assistance. The methods of construction and connection with the body of the leg in each case are such as to provide assistance in walking from the anterior portion of the foot, at the same time maintaining the height of the wearer when walking, same as is obtained from the natural foot; the feature of phalangeal assistance avoids limping, and removes the fear of toppling forward when standing.

(*d*) The elasticity of rubber affords a yielding medium to alight upon, thus avoiding jars and concussions to the stumps.

Second.—KNEE JOINTS. (*a*) The construction of knee joints is such as to render them capable of adjustment, thus obviating the noise that follows attrition.

(*b*) The disposition of the knee spring, which assists extension of the lower leg, is such as to become neutralized when the leg is flexed to a given angle; this avoids "kicking out" of the lower leg when the wearer is sitting and unguarded.

(*c*) Safety lock. This attachment is combined with the knee mechanism, and provides against treacherous flexing of the knee, thus avoiding dangerous falls.

Third. The production of waterproof legs from natural crook timber with rubber feet attached. This method provides artificial legs for miners, fishermen, woodsmen, to walk, stand, and labor in watery or damp places without impairment to their legs.

Fourth. Aluminum sockets, especially designed for stumps that extend to the ankle and in the body of foot, known by the profession as tibio-tarsal, medio-tarsal, and tarso-metatarsal amputations.

The advantages obtained by the utilization of this metal are as follows:

(*a*) The production of a socket that can be closely fitted to the stump, without touching or allowing painful contact with any of the tender spots on the stump, at the same time possessing sufficient strength to properly support the wearer, no matter what position he may be placed in.

(*b*) The construction of a socket that will possess the requisite strength, without conspicuously enlarging the extremity of a stump that has a bulbous end.

Fifth. Roller Suspenders. The object of this method of suspending an artificial leg to the wearer is to avoid the moving and rubbing of the shoulder straps on the shoulders. The pulleys placed on the sides of the leg admit of the movements of the suspender taking place on the rollers and not on the shoulders.

ARTIFICIAL ARMS.

First.—THE RUBBER HAND. (*a*) Being composed of rubber, is pleasant and natural to the touch and durable in construction.

(*b*) The fingers being ductile, can be placed into accommodating positions.

(*c*) The palm of the hand, being provided with a locking socket, is capable of holding implements of utility with firmness.

Second. The ability to detach the hand at the wrist for laboring purposes.

Third. Rotation of hand at wrist, to provide for pronation and supination.

Fourth. The elbow joint, with lock for holding the arm in a flexed position.

Fifth. Fingers and parts of hands made of rubber, to replace fingers and parts of hands that have been amputated.

Sixth. Rotation of upper arm socket.

The report of the Judges was an indorsement of the above claims.

AWARDS.

For size and importance of the collection; durability, lightness, and strength of material; improved methods of construction, attachments, and superior workmanship.

Signed by,

JENNIE MCCOWEN, M. D.,
R. BUERZ,
J. H. GORE.

In conformity with the Judges' report, the highest award (medal and diploma) was declared in favor of A. A. Marks, 701 Broadway, New York City.

Two additional diplomas were awarded by the Board of Lady Managers, one for DESIGN, and the other for INVENTION.

1895.

COTTON STATES AND INTERNATIONAL EXPOSITION, ATLANTA, GA., HIGHEST AWARD—A DIPLOMA OF HONOR, AND A GOLD MEDAL.

This certifies that the appropriate jury has awarded to A. A. Marks of New York City the Gold Medal "For the most complete exhibition of ingenious mechanics for the relief of physical defects and deformities, namely: Artificial Legs, Rubber Feet, Artificial Knee Joints, Self-Adjusting Suspenders, Artificial Arms, Rubber Hands, Duplex Elbow Joints, and Aluminum Socket Legs; also for Imitating the Movements of Knee, Elbow, Wrist, and Finger Joints."

DANIEL C. GILMAN, President Jury of Awards.

Attest: C. A. COLLIER, President and Director-General.

ATLANTA, Nov. 1, 1895.

1896.

AMERICAN INSTITUTE, NEW YORK—MEDAL FOR SUPERIORITY.

Judge's Report:

After a full and impartial examination of the articles above described, the undersigned Judges make report:

That the exhibit of A. A. Marks of artificial limbs, and apparatus for relief of various deformities, is the most extensive and complete to be found within the Fair.

Special attention is called:

First.—To the rubber foot with imbedded metallic mattress spring combined with the Marks artificial leg.

Second.—To the flexible fingers on artificial hand, and their great adaptability to every day use.

Third.—The use of aluminum in place of wood for climatic variations seems to be of practical use for those engaged in certain employments.

Finally, the ingenious combination Knife and Fork for the one armed is highly commended.

HENRY T. PEIRCE, M. D.,
GEO. H. RICH, D. D. S.,
Judges.

We recommend the award of the Medal of *Superiority.*

1897.

TENNESSEE CENTENNIAL AND INTERNATIONAL EXPOSITION.

Held at Nashville, Tenn., from May 1st to October 30th, 1897.

The highest and only award for artificial limbs was a diploma of excellence and a silver medal, which were given to A. A. Marks of New York.

The merits that received especial recognition were: Artificial Legs

with Rubber Feet, Adjustable Knee Joints, Artificial Arms with Rubber Hands, and a Combination Knife and Fork for one-armed persons.

This makes a total of 29 highest awards received by A. A. Marks.

1898.

TRANS-MISSISSIPPI AND INTERNATIONAL EXPOSITION.

Held at Omaha, Neb., from June 1 to November 1, 1898.

Diploma and Gold Medal awarded to A. A. Marks, 701 Broadway, New York.

Marks' Artificial Legs with Rubber Feet and Artificial Arms with Rubber Hands are superior to all others in the following points:

Excellence of mechanical construction.

Minimum weight, maximum durability.

Noiselessness.

Motions that simulate nature.

Knee-joints, adjustable and noiseless.

Suspenders, of variety adaptable to every condition.

Knee-lock for short and enervated stumps.

Fittings that permit pressure at points of toleration, avoiding impact on the vascular parts, thereby preventing choking of blood vessels.

Rubber hands with ductile fingers, most accommodating and possessing the greatest range of utility.

1900.

EXPOSITION UNIVERSELLE DE PARIS, FRANCE.

Oct. 15, 1900.

A. A. MARKS, New York.

DEAR SIR:—I am instructed by Commissioner General Peck to inform you that you have been awarded the

(GRAND PRIX) Grand Prize

for your exhibit in Class 16 at the International Exposition, Paris, 1900.

Respectfully yours,

J. H. GORE, Juror-in-Chief.

The basis on which the awards were made and classified:

20	Points of Merit	entitled	the	Exhibitor	to	Grand Prize.
15	"	"	"	"	"	Gold Medal.
10	"	"	"	"	"	Silver Medal.
5	"	"	"	"	"	Bronze Medal.
1	"	"	"	"	"	Honorable Mention.

A. A. MARKS, 701 BROADWAY, NEW YORK,

in competition with nearly fifty manufacturers from all parts of the world, won over 20 POINTS OF MERIT, therefore received the ONLY GRAND PRIZE FOR ARTIFICIAL LIMBS. This is unprecedented in the History of Artificial Limbs.

PART IV.

TESTIMONIALS AND COMMENDATIONS.

WHAT THE DOCTORS SAY.

We, the undersigned, are professionally interested in the subject of artificial limbs. We have witnessed the operation of the rubber hand, foot (or both), and acknowledge that they possess exceptional merit. We cheerfully endorse them, and give you permission to refer to us in your pamphlet.

LEWIS A. SAYRE, M. D.,
285 5th Ave., N. Y. City.
Consult. Surg. Charity and Bellevue Hosp.

GEO. F. SHRADY, M. D.,
8 East 66th St., N. Y. City.
Consult. Surg. Hosp. Rupt. and Crippled, N. Y. Cancer Hosp.
Visit. Surg. St. Francis' Hosp. Editor *Medical Record.*

R. B. GRANGER, M. D.,
72 Fifth Ave., N. Y. City.
The New York Medical Journal.

RUEL S. GAGE, M. D.,
400 West 22d St., N. Y. City.

HENRY RUHL, M. D.,
842 East 164th St., N. Y. City.

D. D. STEVENS, M. D.,
252 West 38th St., N. Y. City.

S. R. ELLISON, M. D.,
266 West 43d St., N. Y. City.

G. M. EDEBOHLS, M. D.,
198 Second Ave., N. Y. City.

J. W. METCALF, M. D.,
642 Gates Ave., Brooklyn, N. Y.

J. E. RICHARDSON, M. D.,
125 So. Oxford St., Brooklyn, N. Y.

F. G. WINTER, M. D.,
18 Patchen Ave., Brooklyn, N. Y.

J. DENSMORE POTTER, M. D.,
Delphi, Onondaga Co., N. Y.

GEO. C. HUBBARD, M. D.,
Tottenville, Richmond Co., N. Y.

H. D. BROWN, M. D.,
Potsdam, St. Lawrence Co., N. Y.

M. CAVANA, M. D.,
Oneida, Madison Co., N. Y.

THOS. M. JOHNSON, M. D.,
309 Main St., Buffalo, N. Y.

A. S. Zabriskie, M. D.,
Suffern, Rockland Co., N. Y.

B. A. Watson, A. M., M. D.,
94 Fairview Ave., Jersey City, N. J.,
Author of "Amputations and their Complications."

Romeo F. Shabert, M. D.,
151 Washington St., Hoboken, N. J.
Surg. St. Mary's Hosp.

J. Henry Clark, M. D.,
26 E. Kinney St., Newark, N. J.
Surg. St. Barnabas' Hosp.

Jos. W. Taylor, M. D.,
1747 Humboldt Boul., Chicago, Ill.

John L. Taylor, M. D.,
Succasunna, Morris Co., N. J.

J. W. Silvara, M. D.,
Ringoes, Hunterdon Co., N. J.

F. H. Milliken, M. D.,
3614 Walnut St., Philadelphia, Pa.

B. F. Dilliard, M. D.,
East Bangor, Northampton Co., Pa.

I. C. Gable, M. D.,
26 So. Beaver St., York, York Co., Pa.

W. P. Snyder, M. D.,
Spring City, Chester Co., Pa.

A. Le Bar, M. D.,
Stroudsburg, Monroe Co., Pa.

J. M. Strohm, M. D.,
Fredericksburg, Lebanon Co., Pa.

Julius Stricker, M. D.,
Marshallton, Chester Co., Pa.

W. C. Foster, M. D.,
6106 Penn. Ave., Philadelphia, Pa.

D. C. Waters, M. D.,
Arnot Mines, Arnot, Tioga Co., Pa.

J. Finley Bell, M. D.,
Macleary Building, Portland, Ore.

Julian N. Parker, M. D.,
So. Manchester, Hartford Co., Conn.

E. R. Wheeler, M. D.,
Spencer, Worcester Co., Mass.

F. E. Sanger, M. D.,
Littleton, Grafton Co., N. H.

B. F. Page, M. D.,
Littleton, Grafton Co., N. H.

F. P. Gates, M. D.,
Manteo, Dare Co., N. C.

Jno. D. Myers, M. D.,
Huntington, Cabell Co., W. Va.

E. C. Goodrich, M. D.,
817 Broad St., Augusta, Richmond Co., Ga.

J. S. Todd, M. D.,
74 Marietta St., Atlanta, Fulton Co., Ga.

W. Duncan, M. D.,
Savannah, Ga.

Thos. J. Charlton, M. D.,
Savannah, Ga.

J. W. Farill, M. D.,
Farill, Cherokee Co., Ala.

P. B. Greene, M. D.,
Ft. Payne, De Kalb Co., Ala.

J. D. Carpenter, M. D.,
Rolla, Phelps Co., Mo.

H. F. Pahl, M. D.,
Brenham, Washington Co., Tex.

C. L. Kinnaman, M. D.,
1463 Cedar Ave., Cleveland, O.

T. J. Barton, M. D.,
Zanesville, Muskingum Co., O.

Edmund C. Brush, M. D.,
Zanesville, Muskingum Co., O.
Surgeon C. & M. V. Ry. Co. and B. Z. & C R. R.

O. W. Ward, M. D.,
Duncan's Falls, Muskingum Co., O.

James L. Dickens, M. D.,
La Fontaine, Wabash Co., Ind.

Chas. L. Wilson, M. D.,
Indianapolis, Ind.

J. W. Willis, M. D.,
Woodhull, Henry Co., Ill.

J. R. Gamble, M. D.,
Walhonding, Coshocton Co., O.

M. Cassingham, M. D.,
Gardner, Grundy Co., Ill.

F. B. Strauss, M. D.,
Gibson City, Ford Co., Ill.

C. C. Huckins, M. D.,
Greene, Butler Co., Ia.

J. W. Reed, M. D.,
Lime Springs, Howard Co., Ia.

Win Wylie, M. D.,
West Superior, Wis.

Allen Robert Law, M. D.,
Madison, Wis.

W. C. Bedford, M. D.,
929 East 15th St., Kansas City, Mo.

W. D. Little, M. D.,
Zumbro Falls, Wabasha Co., Minn.

John R. Bailey, M. D.,
Mackinac Island, Mackinac Co., Mich.

W. T. Dodge, M. D.,
Big Rapids, Mecosta Co., Mich.

Alfred David, M. D.,
Atlantic Mine, Houghton Co., Mich.
Physician and Surgeon to the Atlantic Mine Co.

H. M. Haskell, M. D.,
Palmer, Marquette Co., Mich.

F. KELLY, M. D.,
Alba, Antrim Co., Mich.

GEO. A. KENNY, M. D.,
Salmon City, Lemhi Co., Idaho.
Examining Surgeon for Pensions.

S. P. HUNT, M. D.,
Salubria, Washington Co., Idaho.

J. C. RUSSELL, M. D.,
Saranac Lake, Franklin Co., N. Y.

D. W. HERSHEY, M. D.,
Nebraska City, Otoe Co., Neb.

G. H. SIMMONS, M. D.,
Lincoln, Neb.

HENRY WISNER, M. D.,
Sharon, Barber Co., Kans.

SARAH C. WISNER, M. D.,
Sharon, Barber Co., Kans.

J. A. JEANNOTTE, M. D.,
Clyde, Cloud Co., Kans.

A. G. SAXTON, M. D.,
Clyde, Cloud Co., Kans.

DAN'L K. DICKINSON, M. D.,
Lead City, Lawrence Co., Dak.
Surgeon H. G. M. Co.

W. H. TAYLOR, M. D.,
New Market, Jefferson Co., Tenn.

WM. T. DALBY, M. D.,
Salt Lake City, Utah.

J. S. COURTNEY, M. D.,
Lebanon, Linn Co., Ore.

W. F. ANDERSON, M. D.,
255 Second East Street, Salt Lake City, Utah.

H. R. GARNER, M. D.,
Carbonado, Pierce Co., Wash.

J. F. CROPP, M. D.,
Walla Walla, Walla Walla Co., Wash.

C. S. MARSHALL, M. D.,
Mill Village, Nova Scotia, Canada.

I. F. BLACK, M. D.,
Halifax, Nova Scotia, Canada.

I have examined with great care Marks' Patent Artificial Limbs, and cheerfully bear testimony as to the simplicity and efficiency of the invention.
From their peculiar mechanism they perfectly fulfill the purpose for which they are intended, and in my opinion have *no superior*.

JOHN J. CRANE, M. D.,
New York.

I have had frequent occasion to apply A. A. Marks' most valuable Patent Artificial Leg, in cases where I have unfortunately been compelled to mutilate my patients by amputation, and the admirable imitation which that substitute has given of the original limb, and the perfect satisfaction to the wearer, is the highest possible commendation that I can give it.

LEWIS A. SAYRE, M. D.,
New York.

Having been well acquainted with Marks' Artificial Limbs and various improvements which have been made for the last ten years, and from the great success which has attended the application of his limbs, and the utility of the same, I have no hesitation in saying that their accomplishments have not been surpassed.

The ease and facility with which persons move and walk about, and run, as it were, is such that in many cases the Artificial Limb cannot be detected.

ROBERT S. NEWTON, M. D.,
New York.

I have carefully examined Marks' Artificial Limbs, and believe, because of their simplicity and strength, that they will be sought for by those who may be so unfortunate as to require them.

JAMES R. WOOD, M. D.,
New York.

I have worn Marks' Patent Leg for the last year. I am well pleased with it. It has not required the least repairs. I can walk better with it than any leg I ever used, *except the natural one.*

I consider Marks' India-Rubber Foot a valuable improvement to Artificial Legs.

W. L. APPLEY, M. D.,
Cochecton, N. Y.

It is many years since my son was fitted with one of Marks' Artificial Legs, and sufficient time has elapsed to form an opinion as to its merits.

I think Marks' claim for "superiority over all others, in practical efficiency, simplicity of construction and durability," is well founded, and cannot honestly be denied. I will also add that for ease and comfort in use they cannot be surpassed.

W. H. SCHENK, M. D.,
Flemington, N. J.

Having for the last eleven years used in my practice Marks' Patent Artificial Limbs, with India-Rubber attachments, I feel it my privilege as well as duty to acknowledge my favorable appreciation of them.

Several of the cases have been under my daily observation, while in pursuance of their various avocations, the majority being employees of the Central Railroad of New Jersey, with which I have been a long time connected as surgeon. I will only mention a single case, that of Patrick Liddy, of this place, who was supplied with a pair of limbs for the lower extremities. Fortunately both knee joints had been preserved, and he has since the application been able to perform a considerable amount of walking, and usually without any cane, regarding it as an encumbrance.

I may, if desired, by consent of the parties, refer to others having lost one lower extremity, who almost or wholly succeed in their natural desire to escape observation ; another remark is due, that the India-Rubber Foot does *not* produce that wooden-leg sound so often noticed on the street from *less* modern appliances. I have not yet heard a patient express dissatisfaction, and feel well sustained by experience in giving this approval.

Yours truly,
J. S. MARTIN, M. D.,
Elizabethport, N. J.

In reply to yours of the 26th ult., I can reply that I have purchased Marks' Artificial Limbs for patients, and that they invariably have given entire satisfaction.

C. EWER,
Asst. Surgeon U. S. A.,
Fort Sidney, Neb.

The persons to whom Marks has furnished artificial appliances for amputations of the feet (one Symes' and the other Pirogoff's operations) express themselves as being perfectly satisfied.

The appliances are light, easily applied, and do not produce excoriation or tenderness at the end of the stump.

I consider that Marks' appliances fulfill all the indications called for in providing artificial support after amputations.

HENRY P. GEIB, M. D.,
Stamford, Conn.

From my observations since 1882, I could give you a more emphatic endorsement than before.

C. L. WILSON, M. D.,
Indianapolis, Ind.

I cheerfully and fully endorse the Marks rubber hands and feet. I have several patients using them and with perfect satisfaction.

Sincerely,
J. HENRY CLARK, M. D.,
Newark, N. J.

In matter of finish, durability, simplicity of construction, completeness of action, and perfect adaptation to stump, the Marks artificial limbs are far superior to anything I have ever seen.

W. H. TAYLOR, M. D.,
New Market, Jefferson Co., Tenn.

I ordered a Marks artificial hand and arm for a patient, and it has given good satisfaction.

J. FINLEY BELL, M. D.,
Osceola Mills, Pa.

BROOKLYN, N. Y.

Refer to me as to the merits of the Marks limbs.

Yours truly,
J. W. METCALF, M. D.

NEW YORK.

I know of no artificial appliance that so nearly simulates nature as those of your manufacture.

R. B. GRANGER, M. D.

DELPHI, ONONDAGA CO., N. Y.

Mrs. K. E. Cardner's leg works to a charm. She can get about without even a walking-cane, on the Marks leg. Does her housework without any difficulty.

J. DENSMORE POTTER, M. D.

I have used the "Marks Artificial Legs" with rubber feet, and they give more complete satisfaction than any others I have ever seen. Have one case of double amputation (thigh and leg); the man walks with ease and comfort simply with a cane.

JNO. D. MYERS, M. D.,
Huntington, W. Va.

The pair of artificial legs I ordered of A. A. Marks about ten years ago for Jno. Nodolf are wearing well and give perfect satisfaction.

ALLEN ROBERT LAW, M. D.,
Madison, Wis.

My bias is very strongly in favor of the solid "Rubber Feet and Hand Limbs" manufactured by A. A. Marks, on the grounds of, first and foremost, durability; in the case of the foot solidity and firmness of footing, with sufficient pliability and no side motion, and in the case of the hands pliability. I have yet to find the person wearing either who finds any fault, which I cannot say in regard to many rattle-traps.

C. C. HUCKINS, M. D.,
Greene, Ia.

Marks rubber hand has been especially satisfactory,

W. C. BEDFORD, M. D.,
Fergus Falls, Minn.

I have no idea of ever recommending a jointed limb again. Marks rubber foot fully meets the wants.

JAS. JOHNSTON, M. D.,
Sault Ste. Marie, Mich.

I am pleased to add that the leg I procured from A. A. Marks for my patient works to perfection. He does anything that is to be done on a farm, and has lately learned to dance.

H. R. GARNER, M. D.,
Carbonado, Wash.

A. A. Marks makes by all odds the best artificial limb made. I have a number of patients wearing the Marks limbs who would not accept any other maker's artificial limb as a gift.

WIN WYLIE, M. D.,
Wausau, Wis.

I endorse Marks artificial limbs with pleasure. My associate, Dr. T. I. Charlton, who rendered me very valuable assistance in taking the measurements for the two last artificial legs ordered from A. A. Marks, also endorses them.

No complaint has been made to me by any persons for whom I have procured the Marks artificial limbs, and they seem fully adapted for all that is required of them.

W. DUNCAN, M. D.,
Savannah, Ga.

The endorsement of patent articles, of whatsoever kind and description, is something I very seldom do, but the Marks artificial limbs with rubber hands and feet meet my unqualified approval, as being the *best* I have ever had occasion to recommend to those desiring artificial limbs.

J. R. GAMBLE, M. D.,
Blandinsville, Ill.

I have had various opportunities of testing the merits of the Marks artificial limbs with rubber hands and feet, and can cheerfully recommend them to be superior in every respect to any other which has come under my observation, and that the operation of your rubber hand and foot will prove to possess exceptional merit to any who will try their virtues.

WM. T. DALBY, M. D.,
St. John, Ariz.

I have ordered several of the Marks artificial limbs for patients who had lost their limbs above and below the knee, and in every instance they have given perfect satisfaction.

D. K. Dickinson, M. D.,
Surg. H. G. M. Co.,
Lead City, S. Dak.

Indian Agency, Indian Ter.

A. A. Marks, New York.

Dear Sir:—I deem it due to you to say that the artificial leg you furnished the Indian Department for Joe Chilchuana, the Apache Indian, gives the utmost satisfaction in every respect. The young man wears it with the greatest ease, satisfaction, and comfort, and is delighted with it. One who does not know that he is wearing an artificial limb would not detect it in his walk. You are to be congratulated upon the satisfaction your work gives.

Very respectfully, J. S. Lindley, M. D.

Littleton, Grafton Co., N. H.

The leg bought of A. A. Marks is perfectly satisfactory.

F. E. Sanger, M. D.,
B. F. Page, M. D.

I have recommended the A. A. Marks very valuable patent artificial limbs to a number of my patients, who are wearing them with perfect satisfaction, and I have no hesitancy in saying in my judgment they fulfill their purpose better than any others that have come under my observation.

I. C. Gable, M. D.,
York, Pa.

I have experienced the worth of the A. A. Marks artificial arm, and would say it is a perfect Godsend and worth its weight in gold.

J. W. Farill, M. D.,
Farill, Ala.

I thoroughly believe the Marks make of limbs with rubber hands and feet are superior to any other make.

The leg purchased by me for Miss Aggie Holland is giving good satisfaction. I can heartily recommend the Marks make of artificial limbs.

Yours truly,
C. S. Marshall, M. D.,
Mill Village, N. S., Canada.

The artificial leg that A. A. Marks made for a patient of mine, a boy ten years of age, is perfect in every particular, and the ease and grace with which he runs about and uses it is remarkable.

Amputation was performed October 25. November 29 the boy was sliding on the ice with his playmates. January 10 the boy was skating, with practically no inconvenience whatsoever. I think the Marks limb one of the greatest boons to unfortunate humanity that exist.

J. C. Russell, M. D.,
Saranac Lake, N. Y.

WHAT THE WEARERS SAY.

ALABAMA.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

CHEROKEE COUNTY, ALA., Jan. 1, 1896.

I am wearing one of A. A. Marks' artificial arms, and am much pleased with it, and would say that it is all he claims for it.

MISS MARY CUMBY.

Endorsed by J. W. FARILL, M. D.

ANKLE-JOINT AMPUTATION—ALUMINUM SOCKET.

Dec. 30, 1895.

A. A. MARKS, ESQ.:

DEAR SIR :—After using one of your "new aluminum" legs for "Chopart's amputation" about four years, I am convinced that they are the best made for such amputations. They are as you say, strong, light, neat, and very efficient. I recommend their use to all needing such a leg.

I remain,

Very respectfully yours,

J. D. SUTTON.

Mobile, Ala.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

TALLADEGA COUNTY, ALA., July 6, 1896.

MR. A. A. MARKS :

DEAR SIR :—I have been using one of your legs for nearly ten years ; I find it all that could be expected. I have a five-inch stump only, and have been working for different railroads for eight years, as station agent and operator. I never use a stick or crutch, can walk extra well for one having so short a stump. I am,

Very truly yours,

J. E. JOLLY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CHILTON COUNTY, ALA., March 7, 1896.

MR. A. A. MARKS :

DEAR SIR :—I received my leg November 4, found it in good order, and a good fit. I am well pleased with the change to rubber foot ; think it well worth what it cost. Success to your patent foot ; it is a great improvement.

Yours respectfully,

J. A. PROPST.

ARIZONA.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

GRAHAM COUNTY, ARIZ., Feb. 11, 1887.

A. A. MARKS, ESQ.:

SIR:—I am very much pleased with the *cork* leg you sent me. I am around daily without the assistance of a stick, and can ride horseback as well as ever. I get around just as fast as if I had both natural legs.

You can hardly tell the difference in my walk.

The stump has never been sore since I have been using the leg.

Respectfully, etc.,

EDWARD SCOTT.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

MOHAVE COUNTY, ARIZ., Aug. 13, 1894.

MR. A. A. MARKS:

DEAR SIR:—The leg I ordered for Mr. Sorrensen three years ago was all that could be desired, and if you succeed in giving my other patients as serviceable limbs as that man, you will do all that could be desired.

Yours very truly,

R. B. KNIGHT, M. D.

MARICOPA COUNTY, ARIZ., Oct. 9, 1894.

MR. A. A. MARKS:

DEAR SIR:—The foot you placed on my old ankle-joint leg is all right, and gives perfect satisfaction.

Yours truly,

ROY FRANKENBERG.

ARKANSAS.

BOTH LEGS AMPUTATED. ONE ABOVE THE KNEE AND THE OTHER BELOW.

HEMPSTEAD COUNTY, ARK., Dec. 12, 1887.

TO WHOM CONCERNED:—On the 13th of January, 1884, I had the misfortune to lose both my legs in a railway accident, one four inches above, the other three and one-half inches below the knee. The following October I applied a pair of A. A. Marks' artificial limbs with rubber feet, which enabled me to walk with but little difficulty, with only the use of one cane, and without that when walking about the office.

The rubber feet prevent an unnatural sound while walking on the floor; also prevent the uncomfortable jarring of the stumps which is experienced in the wooden feet of other manufacturers.

Yours respectfully,

D. M. ALKIRE.

BOTH LEGS AMPUTATED AT THE ANKLE JOINTS.

Fitted from Measurements.

GARLAND COUNTY, ARK., Dec. 17, 1895.

A. A. MARKS, ESQ., New York :

DEAR SIR :—I lost both my limbs from frost bite in November, 1880, and since that time I have been wearing your patent rubber foot. I am now a much larger man than when I first wore the limbs; it gives me pleasure to state that I have no difficulty in attending to my duties, which are as laborious as those of most any man with no bodily infirmities. I weigh about two hundred pounds. It is a surprise of the most remarkable kind among my friends here to see the way I get about after knowing my misfortune. None of them dream of such a thing unless I tell them, and I think you yourself would doubt the condition of my limbs if you were to see me going around among other people. I stand amazed at your own ingenuity and capability of making maimed whole.

Very truly, your patron,

G. W. TATUM.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

JEFFERSON COUNTY, ARK., Nov. 14, 1887.

MR. A. A. MARKS, New York City :

DEAR SIR :—The arm I ordered of you last April gives perfect satisfaction. The rubber hand is immense. I do not think there could be anything gotten up to equal it. It looks perfectly natural ; in fact, some of my friends did not know that I had lost my arm. Being a machinist and engineer, it enables me to follow my profession as ever. I can file, hold the chisel, hold the reins to ride or drive, cut my own meats, and many things that one would not believe could be done with an artificial arm. I have seen several kinds of artificial arms, but none to equal yours with rubber hand. It is very durable, easily adjusted, and soft to the touch. I can write very well with it, though I do not as a general thing use it for that purpose. The hook attachment is very valuable in doing rough work. I would advise those that have to wear artificial limbs to give you a trial before purchasing elsewhere.

Yours truly,

W. E. SNIPES.

CALIFORNIA.

BOTH LEGS AMPUTATED BELOW THE KNEES.

Fitted from Measurements.

ALAMEDA COUNTY, CAL., Dec. 18, 1895.

MR. A. A. MARKS :

DEAR SIR :—I take great pleasure in testifying to the merits of your artificial limbs. I have used them for about eleven years.

They were fitted from measurements. I have worn them constantly without any trouble. I am by profession a lawyer.

In my opinion your legs are the best made.

Yours sincerely,

S. B. MCKEE.

ABOVE-KNEE AMPUTATION.

SANTA CLARA COUNTY, CAL., Dec. 30, 1895.

MR. A. A. MARKS :

DEAR SIR :—Larger experience has only served to make me more satisfied

with the work that you have done for me. The especial points that have given me satisfaction are three—viz.: the leg fits well, it makes no noise, and needs no repairs.

Truly yours,

R. B. PEET, Rector.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

SAN BERNARDINO COUNTY, CAL., Dec. 26, 1895.

A. A. MARKS, New York :

DEAR SIR :—My son, John Jerome Booth, aged eighteen years, who had the misfortune to loose a foot about thirteen years ago, has used one of your artificial limbs for the past twelve years with complete satisfaction. Soon after procuring the Marks' limb I concluded to try ——, and for that purpose ordered one with lateral motion. Here, then, I had a fair opportunity for competitive trial. As a result, the leg was returned for repairs in six months, while the Marks' was never returned except for lengthening. The son runs, jumps, climbs, and skates as well as any of his companions, and the closest observers, when informed of his misfortune, are at a loss to determine which is the real and which the artificial limb.

Your obedient servant,

JAMES P. BOOTH, M. D.,
Surgeon A. & P. R. R. Co.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

SAN DIEGO COUNTY, CAL., Dec. 20, 1895.

A. A. MARKS :

DEAR SIR :—Having been a wearer, for the last fourteen years, of one of your artificial limbs with rubber foot attached, I wish to say that in lightness and *durability* your limbs are unparalleled.

My own, I am using yet, will last me for a good time to come.

My position as Deputy County Treasurer requires standing on my feet the most of the time, and very much walking from desk to desk.

I have used artificial limbs for twenty-one years, but your make is the best.

Very truly yours,

OTTO FOSTER.

BELOW-KNEE AMPUTATION.

Mar. 9, 1895.

A. A. MARKS :

DEAR SIR :—I purchased a leg from you in 1863, before you used the rubber foot, and since then I have worn the —— leg, and the —— leg, and, as you know, I have used the rubber foot a great deal of the time, since you introduced it in the market. It is far ahead of any leg that I have worn, for durability and economy, and I always feel safe when wearing it, as there are no springs or cords to break, no squeaking or clattering sound to attract the notice of the people as I pass by, and there is nothing to oil, except the knee-joints, which can be done in a few moments, and then my mind is easy, so far as the leg is concerned, for the next two or three days. As for repairs, I would state that I have worn the rubber foot for a straight seven years without spending a nickel on it. My leg is amputated about four inches below the knee, and my occupation is a clerk.

I do considerable walking every day.

Respectfully yours,

THOMAS GIBSON.

San Francisco, Cal.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

TEHAMA COUNTY, CAL., Dec. 22, 1895.

A. A. MARKS:

DEAR SIR:—My leg was amputated about three inches above the ankle-joint. I have worn an artificial leg made by you for more than eleven years. It has given me entire satisfaction, inasmuch as I am enabled to attend to all my former duties without interruption. I frequently follow a plow all day, often twenty miles, run a header, and do other such arduous work.

J. T. STILLWELL.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

TULARE COUNTY, CAL., Dec. 2, 1895.

A. A. MARKS:

DEAR SIR:—The leg and foot that you sent for my son in 1876 lasted remarkably well for such an energetic fellow; hardly still a moment, when he goes he will get there as soon as the best of them. The limb performed to satisfaction in every respect.

Respectfully,

WM. THOMSON.

ANKLE-JOINT AMPUTATION.

Fitted from Measurements.

ORANGE COUNTY, CAL., Dec. 20, 1895.

A. A. MARKS:

DEAR SIR:—I am getting along nicely with my leg. It was a good fit and works all O. K.

Yours respectfully,

ED. TEDFORD.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

SANTA CLARA COUNTY, CAL., Dec. 24, 1895.

A. A. MARKS:

DEAR SIR:—My left hand is off just above the wrist. A little over ten years ago I had one of your artificial hands made from measurements and have worn it every day since.

It fits perfectly, and, were it not for the glove, could not be distinguished from the natural hand. I find it very useful, and if compelled to, could learn to write with it.

Yours truly,

CHARLES HAMMOND.

WRIST AMPUTATION.

Fitted from Measurements.

SANTA CLARA COUNTY, CAL., Dec. 24, 1895.

A. A. MARKS:

DEAR SIR:—I have been using one of your most valuable artificial rubber hands. I am greatly pleased with it. I have had it for one year, and I can use a knife and fork, carry a satchel, etc. My occupation is engine-driving. My hand was cut off at the wrist.

I am, respectfully,

THOMAS TONKIN.

COLORADO.

ABOVE-KNEE AMPUTATION.

LAKE COUNTY, COL., Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn limbs of your patent over twenty years, and I think none that are made will compare with yours.

I wore three other kinds before getting yours. All the first three had ankle joints that kept me busy repairing. Since I have been wearing yours I have no repairing to do. I am running a ranch, digging sage brush, and all other kinds of rough work.

Respectfully yours,

W. H. ROYSTON.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

PUEBLO, COL., Dec. 5, 1895.

A. A. MARKS, New York City:

DEAR SIR:—I purchased my artificial leg of you ten years ago. I have nothing but praise to offer. You followed my measurements in making it with such exactness that I can't see how it could fit better if I had gone to New York in person.

I am farming out here, and can harrow, mow, and do all manner of farm work, although my stump is but eight inches long.

The rubber foot is especially serviceable in that kind of work, as it is elastic enough, and has stability.

Yours very truly,

THOMAS BARBER, JR.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

SEDGEWICK CO., COL., March 10, 1900.

MR. A. A. MARKS:

DEAR SIR:—Your artificial limbs cannot be recommended too highly. The one you made for me the 5th of January, 1899, has filled and more than filled my expectations. I ride a bicycle, skate, run, and do almost anything I want to.

Last summer I worked in a creamery, and could carry a can of milk which weighs a hundred pounds. My weight is about 150 pounds.

So, the combined weight of myself and can was about 250 pounds, and I think that is pretty good for one who has so short use of a limb. I am greatly pleased with what you have done for me.

Respectfully yours, JOHN POLZIN.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

FREMONT COUNTY, COL., Dec. 17, 1895.

MR. MARKS:

DEAR SIR:—I have worn the artificial leg you made for me, in the mines, and could get along as well as any of the other miners. I have worn other styles of legs, but I find yours to be much better. There is another party here using your leg, and he walks splendidly with it.

Respectfully yours,

WM. MASTERS.

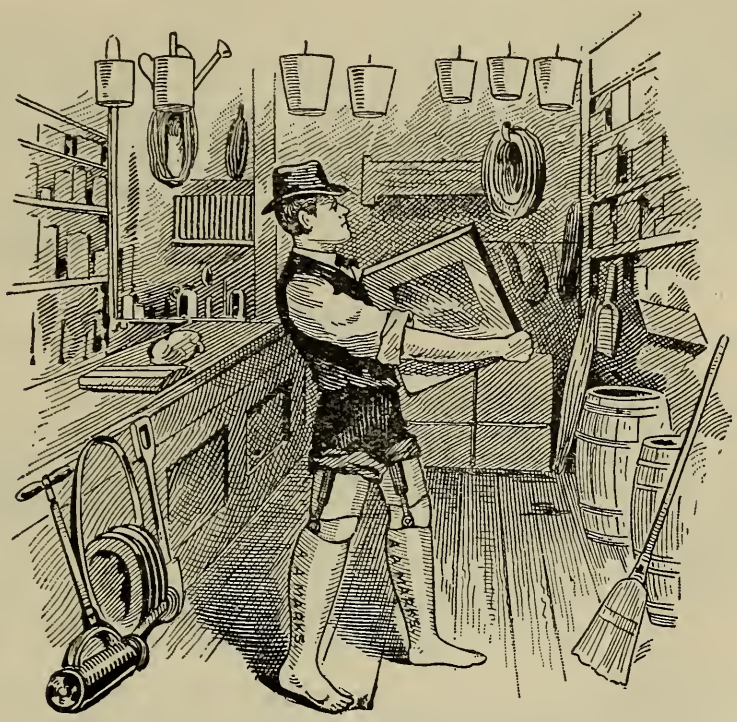
BOTH LEGS AMPUTATED BELOW KNEE.

Fitted from Measurements.

ARAPAHOE COUNTY, COL., Aug. 3, 1893.

A. A. MARKS:

DEAR SIR:—I received my limbs July 31, and put them on at once. Wore them that evening and all the following day, working in the store from six o'clock in the morning until ten o'clock at night. I must say that I am well



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pleased with the limbs. The fittings are as good as could be made under any circumstances. My limbs are lighter than I expected, as I wrote you in ordering them that I wanted them extra strong, as my work was heavy. They seem to have the requisite strength.

E. B. SCULL.

CONNECTICUT.

BOTH LEGS AMPUTATED. ONE AT THE ANKLE, THE OTHER BELOW THE KNEE.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I wish to say this is to certify that I have had constantly in use two of Mr. A. A. Marks' patent artificial limbs since 1878, and I am glad to state they have come up to my greatest expectations.

I am in the oyster business, and have not lost any time on account of wearing two artificial limbs. During my seventeen years of experience on artificial limbs, I have worked hard fifteen years at the oyster business, doing the raking myself. I have had but very little repairing done.

Yours respectfully,

Fairfield County, Conn. ALBERT W. MILLS.

(Illustrated on page 137.)

FATHER AND SON—THE FORMER ABOVE THE KNEE, AND THE LATTER BELOW THE KNEE.

BRIDGEPORT, CONN., Dec. 16, 1895.

MR. MARKS:

DEAR SIR:—I am glad to say your limb has given me great comfort and much satisfaction.

There is a saying, "It runs in the family." The wooden leg mania seems to have no exception. My boy Willie was ten years old when he lost his foot by the cars on the N. Y., N. H. & H. R. R. The amputation was made three inches below the knee.

He runs and jumps on the trains, and is as active as anyone with the naturals. He is frequently asked if it was not his brother that lost his leg. Through your great invention he is almost able to forget his misfortune. Willie says there is no one in the world that makes as noiseless a limb as you do. He and I both agree that your legs with rubber feet are without equals to build a poor fellow up after he has been mashed to pieces.

Respectfully,
PATRICK BRAY.
W. J. BRAY.

ABOVE-KNEE AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

Having been using one of your artificial limbs for some time I feel quite pleased with it, and would always recommend them to anyone in need of such. I lost a leg about nineteen years ago by a running sore, and have only six inches of stump left. I do not think the rubber foot has any equal.

MATTHEW WHELAN.

Litchfield County, Conn.

ABOVE-KNEE AMPUTATION.

LITCHFIELD COUNTY, CONN., Dec. 16, 1895.

MR. MARKS:

KIND FRIEND:—I have worn your artificial limbs from childhood up. I can truthfully speak of their merits. I have worn a limb with a rubber foot for thirty years and doing ordinary housework.

Respectfully yours,
MRS. A. C. FLEEZER.

ABOVE-KNEE AMPUTATION.

BRIDGEPORT, CONN., Jan. 2, 1896.

MR. A. A. MARKS:

DEAR SIR:—In May, 1882, I was so unfortunate as to lose my right leg above knee. In September, 1882, I was advised to procure one of your patent artificial limbs with rubber foot.

It now gives me sincere pleasure to be able to inform you that the artificial leg which you made for me has more than realized my expectations. The durability of your patent has, I think, been fully established. The foot appears to be as good now as when I first commenced to wear it.

I cheerfully recommend your legs to all needing them.

I remain, dear sir,
LEONARD MANZ.

ABOVE-KNEE AMPUTATION.

NEW HAVEN COUNTY, CONN., Dec. 13, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—The limb which I purchased from you eight years ago is giving entire satisfaction, and is in every way as recommended.

Most respectfully yours,
JOHN DALY.

KNEE-BEARING AMPUTATION.

Dec. 16, 1895.

A. A. MARKS, New York :

DEAR SIR :—I have worn one of your legs fifteen years continuously. I cannot express my delight in having found so great a treasure.

I am, respectfully yours,

Fairfield County, Conn. WILLIAM HICKERSON.

BELOW-KNEE AMPUTATION.

BRIDGEPORT, CONN., Dec. 17, 1895.

A. A. MARKS :

DEAR SIR :—I have been wearing your patent artificial leg for the past twenty-three years ; I had previously worn others, but they were not satisfactory. In my opinion, your leg is far superior to any other artificial leg made. First, because of its ease, elasticity, and stillness ; these are obtained by the use of the rubber foot, and I think it is the only sensible thing to use for this purpose. Second, because of their durability, which is no small item.

I am in the insurance and real estate business, and am continually on the go. There are few who walk as much as I do. My leg is amputated four and a half inches below the knee.

Yours very truly,

A. E. BARTRAM.

BELOW-KNEE AMPUTATION.

BRIDGEPORT, CONN., Dec. 18, 1895.

A. A. MARKS :

DEAR SIR :—On February 3, 1887, I purchased an artificial leg from you. In four days after I commenced work on steamer *Rosedale*. I am on my feet from 6.30 A. M. to 7.30 P. M. daily. I have lost no time, neither have I experienced any inconvenience in the use of it. I have not spent anything for repairs, and it remains the same as when purchased. My leg was amputated one and one-half inches below the knee.

Yours truly,

CONRAD PRUTTING.

BELOW-KNEE AMPUTATION.

FAIRFIELD COUNTY, CONN., Dec. 18, 1895.

A. A. MARKS, ESQ. :

DEAR SIR :—The artificial limb that I have from you I have worn continually for thirteen years. I think that the rubber foot is a great improvement.

Respectfully yours,

FREDERICK A. SCOFIELD.

BELOW-KNEE AMPUTATION.

LITCHFIELD COUNTY, CONN., Dec. 17, 1895.

A. A. MARKS, ESQ. :

DEAR SIR :—In 1864 I lost my leg by amputation below the knee. In 1865 I procured, as I supposed, one of the best artificial legs in use, the wearing of which gave me much pain, and I was often obliged to go back on crutches until the irritated and swollen stump was again in condition to wear the leg. It also annoyed me very much by frequent rattling of the ankle joint. Repair bills were from $6 to $8 a year. I was obliged to use a cane when walking, and walk only when obliged to do so. I wore this leg about two years. I met a great many wearing artificial legs made by various firms, all of whom were laboring under difficulties similar to my own. I think it was in 1867 or 1868, while in Watertown, N. Y., I met a gentleman wearing one of your artificial legs with rubber foot. I was surprised to see this man go up and down stairs actually on a run. He also moved about among the guests at the hotel noiselessly and quietly, with the grace and ease of natural motion. I have forgotten the name of this gentleman, who advised me to get one of your artificial legs with rubber foot. I at once wrote to you, requesting you to send me instructions and blanks for taking measurements.

I received a prompt reply, and ordered a leg. I have worn your legs constantly from the time I first received one, never having lost an hour's time from its use.

I go up and down stairs, up and down hill, through the brush, hunting and fishing. In fact, I go when and where I please with ease and comfort.

Very respectfully,

E. A. NELLIS.

BELOW-KNEE AMPUTATION.

Dec. 23, 1895.

A. A. MARKS, New York:

DEAR SIR:—In August 29, 1884, I lost my right foot. I made a careful study of artificial limbs of different makes, and with advice of my doctor selected yours. I applied it on the 1st of December, thirteen weeks after amputation, and in a short time I was able to walk so well that hardly anyone knew I had lost my foot.

I work and do all my business now with all ease possible for anyone with a false limb, and feel as well as ever.

Very truly yours,

Middlesex County, Conn. LUCIUS J. STEVENS.

ANKLE-JOINT AMPUTATION.

HARTFORD, CONN., Dec. 16, 1895.

DEAR SIR:—In reply to your letter, I think your feet are the best in the world. I have worn mine for over eight years, and have been to dances and a good many social gatherings. I have worn one of the New Haven man's feet, and I could not find the comfort I do with yours. Your feet give more support to the ankle than any other I have seen.

Yours truly,

EUGENE D. FOX.

No. 799 EXTENSION.

NEW HAVEN, CONN., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—The extension with rubber foot manufactured for me has been in constant use for nine years. I can recommend it for durability, neatness, and a comfort that a person with a shortened limb should not be without. Not being able to do you justice enough for the comfort that I have derived from it,

I remain, respectfully yours,

W. C. A.

No. 784 LEG.

WINDHAM COUNTY, CONN., Dec. 16, 1895.

MR. MARKS:

DEAR SIR:—I am very much pleased with the apparatus (with rubber foot) that you fitted to my deformed foot. I have worn it nine years, and think more and more of it. I would not take any amount for it if I could not get another.

I am in a millinery store, and am standing part of the time.

Respectfully yours,

MISS H. S. KENNEDY.

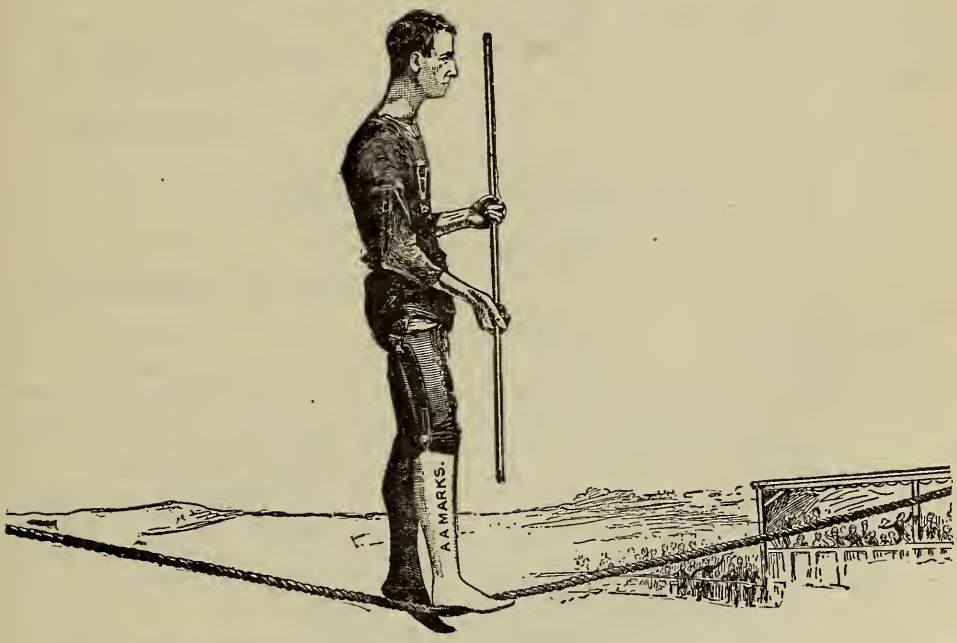
BELOW-KNEE AMPUTATION.

NEW HAVEN COUNTY, CONN., June 12, 1894.

MR. A. A. MARKS, New York :

DEAR SIR :—When I met with the misfortune of losing my right leg, I felt that all the sunshine had passed from my life. Fortunately I came in possession of a copy of one of your books, and as I perused its pages, I received much encouragement. Some tried to dissuade me from entertaining the hope of obtaining an artificial leg inside of four or five months, but I was so determined to get about on two legs again I procured an artificial leg from you in exactly nine weeks after my natural leg was amputated. Five days after I received the leg my doctor observed me skating on the canal. He stopped and watched me ; he was amazed ; he told me that I beat anything he had ever seen.

I was a professional tight rope walker and aeronaut before I lost my leg, and



No. 1207.

I do not propose to allow the loss of a leg to compel me to seek another occupapation. I can walk a tight rope nearly as well as I ever could. The rubber foot enables me to balance with safety. The absence of an ankle joint removes the risk of falling to a large degree. I can walk a tight rope while it is fifty feet above the ground, and when I am dressed, without exposing my limbs, no one would suspect that one of my legs was artificial.

While walking on the ground I never feel the necessity of looking for uneven or bad places. I feel safe and sure on my rubber foot, no matter where I place it. I consider your invention of the rubber foot the most valuable and important, to persons who have lost their natural limbs, of any invention that has been made.

Respectfully yours,

PROF. F. E. JACOBY.

NOTE.—The above cut (No. 1207) has been made from an instantaneous photograph taken of Professor Jacoby while performing on a tight rope. In the cut he is balancing entirely on his artificial leg ; his natural foot is off the rope and is in the act of passing forward to take the next step.

DELAWARE.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

WILMINGTON, DEL., May 25, 1894.

A. A. MARKS:

DEAR SIR:—I use the arm you made for me for all sorts of work. I cannot do without it. I am,

Respectfully yours,

DANIEL BORD.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

NEWCASTLE COUNTY, DEL., Jan. 20, 1893.

MR. A. A. MARKS:

DEAR SIR:—My leg has proved satisfactory for the year that I have worn it. I can do anything at all, and I feel that I cannot thank you enough for it. I remain,

Yours truly,

GEORGE BUTLER.

DISTRICT OF COLUMBIA.

ARM AMPUTATED.

WASHINGTON, D. C., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I desire to say that in 1883 I was unfortunate enough to lose my left hand by the bursting of an overcharged gun. The member was shattered, and amputation resulted at the wrist joint. Shortly thereafter I forwarded to you measurements taken in this city, for one of your artificial hands, which arrived in due season, and which I have worn regularly since. It has indeed proved a most serviceable and valuable acquisition to me, both in use and appearance; it has lasted me most faithfully all these years—twelve in number—and even at this moment it is most convenient to me in holding the paper upon which I write. Very light weight, most durable, and not at all uncomfortable while worn, its workmanship and construction are a monument to the ingenuity of the inventor and manufacturer.

Very respectfully yours,

ROBERT E. MATTINGLY.

ABOVE-KNEE AMPUTATION.

WASHINGTON, D. C., Dec. 21, 1895.

A. A. MARKS, New York City:

MY DEAR SIR:—I lost my leg in front of Atlanta, in July, 1864. Fifteen years later I got one of your rubber-foot legs. I was then mining and smelting at Bonanza City, N. M., and the leg gave good satisfaction in that rough business and rough country. In 1881 I entered Uncle Sam's service, and since that time have traveled over most of our territory, part of the Rocky Mountains, going in all kinds of weather, and in every conceivable conveyance, and I have found your leg much better than you recommended it. The first leg I got in 1880 never had a cent's worth of repairs on it during the five years I wore it, and is now laid away ready for use in case of an emergency. The one you made me ten years ago bids fair to equal the old one. I walk several miles each day without any fear of a break-down, and without that unpleasant dead thud that follows that step of a wooden foot on a plank sidewalk or bare floor.

Very respectfully,

MELVILLE DAVIS.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

WASHINGTON, D. C.

A. A. MARKS, ESQ:

SIR:—I am happy to say that I am very much pleased with the *cork* leg you sent me. I am around daily without the assistance of a stick, and can ride horseback as well as ever.

I get around just as fast as if I had both natural legs.

You can hardly tell the difference in my walk. After using it about a month the stump decreased about a quarter of an inch.

I use nothing but the socks. The stump has never been sore since I have been using the leg.

Respectfully, etc.,

EDWARD SCOTT.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

WASHINGTON, D. C., Dec. 16, 1895.

A. MARKS, New York:

DEAR SIR:—I had tried four different make of limbs before I procured yours, and your limb with rubber foot is the only one that has given satisfaction.

I have given it a fair test for over ten years. The principal advantage of your make over all others is its simple construction; no cords or ankle-joint to break, which causes me to feel perfectly safe in using it. I am considered hard on a limb; my friends frequently remark that I get round on it as if I had not lost a leg. I weigh 154 pounds, and have what is called an upper thigh amputation, and my duties here require me to be on my feet an average of twelve hours a day.

Respectfully,

JNO. T. BRADY.

ABOVE-KNEE AMPUTATIONS.

Dec. 16, 1895.

MY DEAR MR. MARKS:

I know whereof I speak, not only having had an experience of nearly thirty years in wearing an artificial leg, but also being a close and interested observer of the work turned out by other manufacturers in this branch of industry, and my experience and observation lead me to the conclusion that for comfort, durability, and the many advantages (including the slight expense of repairs) arising from simplicity of construction, yours are pre-eminently the limbs for those so unfortunate as to need an artificial for the natural limb.

Yours very faithfully,

WILLIAM GRIFFIN.

Washington, D. C.

ABOVE-KNEE AMPUTATION.

Applied when a Mere Child.

Jan. 1, 1896.

MR. A. A. MARKS, New York:

DEAR SIR:—I desire to offer you a slight testimonial of my gratitude for the comfort that my daughter has derived from the use of the artificial leg which you adjusted for her in May, 1882, and to say here, that no one should ever hesitate to have a limb adjusted in childhood, as it is by far the best plan, though many persons advise cripples to wait until they have attained their growth. My daughter lost her leg in 1879, about three months prior to her sixth birthday, and she has worn the artificial leg made by you constantly since 1883.

She is a powerful child in frame, and when her leg was removed no hopes

were held forth that she would ever be able to wear an artificial limb, owing to the amputation being made so close to the hip joint. The case is considered a remarkable one, and your success in adjusting a leg satisfactorily to so short a stump speaks volumes for your work, which cannot be surpassed ; and not only has the leg given absolute comfort to the child, but she has grown to womanhood, and developed to large and graceful proportions.

Ever gratefully yours,

MAGGIE V. BENNER.

Washington, D. C.

KNEE-BEARING AMPUTATION.

WASHINGTON, D. C., Dec. 16, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—Your leg made for me twenty-two years ago I am wearing yet; it has given the best satisfaction.

I have worn it continually and it is in good order yet.

If I should want another leg I would send to you and get it.

I am on the road continually and have given my leg some pretty hard trials.

Yours very respectfully,

HEMAN BLODGETT.

BELOW-KNEE AMPUTATION.

WASHINGTON, D. C., Dec. 16, 1895.

MR. A. A. MARKS :

DEAR SIR :—I knew nothing of your leg until about 1868. I had then used two legs of different makes. One did not answer at all.

The other I took to you, and had a rubber foot put on, and was so well pleased with the change that I have ever since used your leg. My experience indicates that your foot is superior in durability, at least to those I have tried. In my judgment, its great merits are its *simplicity*, *durability*, and its *elasticity*.

Yours truly,

R. CATLIN,
Late Capt. 5th U. S. Art.

FLORIDA.

LEG ABOVE KNEE.

POLK COUNTY, FLA., Dec. 19, 1895.

Have worn artificial limbs for many years with an amputation two inches above the knee. Have been constantly working as housekeeper and clerk in grocery store during this time.

For nearly eleven years I have been wearing a limb made by you with rubber foot. I find it durable, noiseless, and light, needing no repairs. My limb is superior in *every way* to any I have tried.

MRS. F. A. K. HARRIS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

COLUMBIA COUNTY, FLA., Dec. 16, 1895.

MR. A. A. MARKS :

DEAR SIR :—I have been wearing an artificial leg of different make for over twenty-eight years, and I prefer yours to any I have ever worn. I especially like the rubber foot, as there is no rattling and squeaking, so disagreeable to sensitive ears, and there is plenty of elasticity. I have been wearing one of

yours now for the last twelve years. It was fitted from measurements taken by myself with instructions furnished on blank form from you.

My leg is amputated two inches below the knee-pan.

My occupation is general farming, which I superintend and direct myself.

Respectfully,

T. W. GETZEN.

BELOW-KNEE AMPUTATION.

LEON COUNTY, FLA., Dec. 17, 1895.

DOCTOR A. A. MARKS:

DEAR SIR:—In July, 1863, I lost a foot at the battle of Gettysburg, Pa., amputation just above the ankle. In 1876 I purchased one of your limbs with a rubber foot, having previously worn three of other manufacturers. I therefore claim to be in a position to judge as to who is the best maker of artificial limbs.

I unhesitatingly pronounce your artificial limbs the best I have ever seen.

My occupation is that of a cotton commission merchant, and am forced to do a great deal of outdoor work. I have often been told by acquaintances of ten years' standing that they had known me for some time and had only lately discovered that I was the wearer of an artificial limb, and then had to be told first of the fact.

Very truly,

JOHN DAY PERKINS.

GEORGIA.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

COWETA COUNTY, GA., Dec. 17, 1895.

MR. A. A. MARKS:

I have used one of your artificial legs with rubber foot for ten years. It is one of the best inventions of the kind. I can do anything with this leg. After ten days it became natural to me; it never troubles me any more.

C. L. COOK.

LEG ABOVE KNEE.

Fitted from Measurements.

MARION COUNTY, GA., Dec. 20, 1895.

A. A. MARKS, New York:

DEAR SIR:—I do not know how to give you a stronger indorsement of the superiority of your limbs than to say I have used them constantly for more than twenty years.

I lost my leg at the second battle of Manassas, in 1862, and for several years after I got well I used several other makes before I procured one of yours. Since then I have worn your make exclusively. During this long term of years I have had many business transactions with you, and it is a pleasure for me to express the uniform fairness which has characterized your dealings.

Yours truly,

JAS. M. LOWE.

KNEE-BEARING AMPUTATION.

Fitted from Measurements.

SAVANNAH, GA., Aug. 19, 1893.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing one of your legs for the last nine years and have been much pleased with it; I have found it one of the greatest bless-

ings this world can afford to a cripple as I am. In three weeks from the day my leg was amputated, I sent to you and had an artificial leg made, and when I received it, I was walking without the aid of anything in less than a day. I do all my mother's housework. I still remain,

Yours truly,

SARAH HOUSTON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Jan. 4, 1896.

MR. A. A. MARKS:

DEAR SIR:—I wore a leg fifteen years and liked it well. Sixteen years ago I got one of yours and liked it a great deal better. If I knew I could not get another no money could buy my leg. My occupation is keeping house, such as all country women have to do.

Respectfully yours,

Elbert County, Ga. FANNIE CRITTENDEN.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

GEORGETOWN, GA., Dec. 23, 1895.

A. A. MARKS:

DEAR SIR:—I have been wearing limbs of your make for the last twenty-four years, and I most cheerfully state that they have given great satisfaction. I prefer your make of leg to any other, for noiselessness, durability, and perfect fit from measurements.

The rubber foot surpasses all others, and wears well. I have had three of your limbs, and have given them severe tests. I have been wearing artificial limbs for thirty years; I have worn one other make, but your make is far ahead. I have not paid one cent for repairs. My leg is amputated six inches below the knee.

Very respectfully yours,

JOHN FORD.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

OCONEE COUNTY, GA., Dec. 22, 1895.

A. A. MARKS:

DEAR SIR:—I beg leave to state that I have been wearing your rubber foot for fifteen or sixteen years, that previously I had worn three other diffent makes of artificial limbs, and that yours excels them in every particular, and that I shall never wear any other leg as long as I can get Marks' leg. I have walked twelve miles without inconvenience.

I have examined twenty different makes of legs and feet, and as for power, certainly at the ankle joint, and durability, yours far surpasses them all. The old style ankle joint and cat-gut accompaniments will have to take a back seat. Ours is an age of progress; scientific development will always lay shoddyism in the shade.

Yours truly,

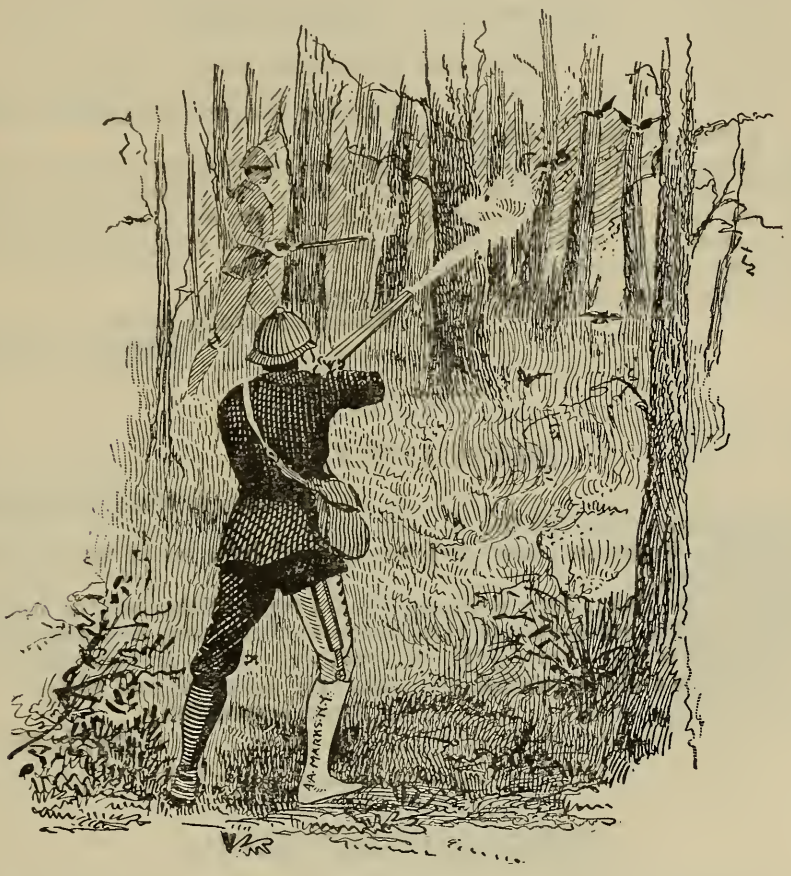
A. LOUIS BARGE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

JASPER COUNTY, GA., Dec. 17, 1895.

I have used your artificial foot and leg continuously for eleven years, and it gives perfect satisfaction. The fit by measurements was perfect. I had no repairs done, although I was in active business, such as salesman in retail dry-



No. 1208.

goods and grocery store, and have walked the old field bird-hunting for one-half day at a time. The rubber foot seems as good to-day as when first bought.

Yours truly,

THOS. EZELL.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

RICHMOND COUNTY, GA., Dec. 16, 1895.

DR. A. A. MARKS:

DEAR SIR:—Eighteen years ago my leg was amputated below the knee.

In conversation with a friend he advised me to order a leg from you. I took the measure in Augusta, Ga., sent it on to you in July, seventeen years ago. I put it on without anything being done to it in the way of adjustment. I have worn it ever since, and have not paid a cent for repairs, and have not done anything on it myself. Have been farming ever since, and being a fleshy man, working hard, you know the test I put the leg to. I know one gentleman who

wore (or tried to wear) five different make of legs, and could not wear any of them. I recommended him to send to you for one. He did so, and now he says he wears it with perfect ease. It was a good day for the maimed when you put the rubber foot into use.

Very respectfully,

GEO. R. DORSEY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

SUMTER COUNTY, GA., Dec. 17, 1895.

MR. A. A. MARKS, New York City:

DEAR SIR:—I have worn your patent, made from measurements for amputation below knee, for ten years with great ease, and without any repairs. I consider the rubber foot the greatest wonder of the limb, giving as it does a life-like motion, and rendering the wearer capable of walking on uneven surface with ease and dispatch.

I work on a farm, my occupation being a planter.

Most respectfully yours,

JESSE J. WEAVER.

INSTEP AMPUTATION.

SAVANNAH, GA., Dec. 18, 1895.

DR. A. A. MARKS, New York:

DEAR SIR:—Fourteen years ago I was injured by a car of the Central Railroad at Savannah.

Since that time I have been wearing one of your artificial feet for amputation at the instep. My occupation is very laborious, being assistant warehouseman for M. Maclean & Co. I can truly say that your rubber feet are very durable, and comfortable and convenient, and I am very much pleased with it.

Yours respectfully,

JNO. L. SPIVEY.

ABOVE-ELBOW AMPUTATION.

ATLANTA, GA., Dec. 21, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing an artificial arm of another manufacturer with your rubber hand attached for several years, and must confess that I am delighted with it, especially the improved adjustable finger. For convenience I keep two rubber hands, one which my wife carefully takes charge of, with my party or opera glove on it, and the other I keep for everyday use; all I have to do is to touch a spring and the hands are changed.

Allow me to mention the fact that in all my dealings with you you have fulfilled your contracts to the letter. You have given satisfaction to me and all my friends in every instance.

One thing I wish to mention: that is, I have more than paid for the extra cost of rubber hand procured from you by the saving in the wear of kid gloves. On the hard wooden hands and fingers a glove will not last over a month; on your hands they do not wear out in six or eight months. This, together with the soft and natural feel, would commend them with me in preference to others if for no other reason.

Your limbs and your dealings give perfect satisfaction. I have never regretted recommending you or them.

Truly yours,

J. S. TODD, M. D.,
Professor Therapeutics and Materia Medica,
Atlanta Medical College.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements,

AUGUSTA, GA., Dec. 18, 1895.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—The artificial arm with rubber hand manufactured for me by you gives perfect satisfaction. My arm is amputated above the elbow. You made perfect fit by measurement taken by my father under your direction. I received the arm April, 1887, and have been wearing it every day since, without the least inconvenience and without any repairs. I do not know how I could do without it. I can use it much better than I expected. I can hold my needles in knitting, and by its aid can do various kinds of fancy work.

Very respectfully yours,

ALICE LAMKIN.

IDAHO.

BOTH FEET AMPUTATED AT INSTEPS.

Fitted from Measurements.

ONEIDA COUNTY, IDAHO, May 10, 1894.

MR. A. A. MARKS:

DEAR SIR:—I received from you a pair of artificial legs on the 18th of September, 1893, and have been wearing them continuously. I can truthfully say that they are the best that I have had, for I suffer no inconvenience in wearing them, and the rubber feet are so elastic and natural that even my most intimate friends are surprised in the change it makes in my appearance. There is no rattling and squeaking of joints and no bolts or screws to get loose, I am more than satisfied with my bargain.

Yours respectfully,

BENJAMIN EDWARDS.

ANKLE AMPUTATION.

Fitted from Measurements.

BANNOCK COUNTY, IDAHO, Jan. 24, 1895.

MR. A. A. MARKS:

DEAR SIR:—The fit is very good; I like the leg very well. I think the India-rubber foot and aluminum socket are first rate. I can go for a walk, climb ladders, run, with the comfortable feeling of knowing that I am not going to break any straps or hinges, etc. I made a snow-shoe trip the other day of about six miles. I got along very well. I am,

Yours truly,

ALFRED HEATLEY.

ILLINOIS.

BOTH LEGS AMPUTATED BELOW THE KNEES.

Fitted from Measurements.

DU PAGE COUNTY, ILL., Dec. 17, 1895.

A. A. MARKS:

DEAR SIR:—I have worn a pair of your artificial feet for eleven years and am well pleased with them. My right leg was amputated six inches, and my left eleven, below the knee.

Through a friend's advice I purchased a pair of your limbs, and am not sorry that I did so, for I don't think they can be beat. I am now following operating, and very often I have occasion to deliver messages to conductors on

through trains. I think nothing of jumping on and off a train running twelve or fifteen miles per hour, and pick up anything and put it on my shoulder that don't weigh over one hundred and twenty-five pounds. As far as walking is concerned, I think that I can keep up with the most of them that have two sound legs. One day last summer a party bet me five dollars that I couldn't walk four miles in two hours; so I took him up. I made it just in one hour and twenty-five minutes, and it was on a fearfully rough road, rocks and hills, lots of them, and didn't even chafe the skin on my stumps. They fit so perfectly from the measurements I sent, and they haven't been any expense to me since I got them. The rubber foot is, I think, as near to the natural foot as it is possible to get it.

I can put my hands on anything that is breast high and spring up on it. Now, these stories look big, but I can bring proof to all of them.

I am, yours truly,

W. J. HARMES.

BOTH LEGS AMPUTATED BELOW THE KNEES.

Fitted from Measurements.

LOGAN COUNTY, ILL., Dec. 21, 1895.

MR. A. A. MARKS:

DEAR SIR:—I take pleasure to inform you of the fact that your artificial limbs with rubber feet have given me entire saisfaction. I wear them with comfort.

Yours respectfully,

MISS A. PRANGE.

BOTH LEGS AMPUTATED BELOW THE KNEES.

Fitted from Measurements.

MOULTRIE COUNTY, ILL., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—The pair of artificial limbs you made me some ten years ago from measurements has given me entire satisfaction. I have not been out one cent for repairs.

Yours truly,

J. M. ROGERS.

KNEE-JOINT AMPUTATION.

McLEAN COUNTY, ILL., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn your artificial leg for about twenty-five years. I am a shoemaker by trade. Knee amputation.

I think that the rubber foot is better than any other kind. It is more pliable.

Yours respectfully,

R. C. CHAINEY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CHICAGO, ILL., Dec. 21, 1895.

MR. A. A. MARKS:

DEAR SIR:—I had an artificial leg made by measure, as you know. It fits all right and has never cost me a dollar in over three years. I am a farmer, and do as much work as my hired men. I never use a cane to walk with. I have a boy seven years old. He often wants to run me a foot-race, but I can beat him.

Yours respectfully,

ED. HEWS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

La Salle County, Ill., Dec. 20, 1895.

Mr. Marks:

Dear Sir:—I have worn your make of artificial limbs eleven years, and like them very well. I am a farmer, and do a great deal of work. My limb was taken off halfway between the knee and ankle joint.

Yours truly,
W. Henry Jones.

ANKLE-JOINT AMPUTATION.

Fitted from Measurements.

Fulton County, Ill., Dec. 19, 1895.

Mr. A. A. Marks:

Dear Sir:—My foot was amputated when but a child of thirteen, and as soon as it was sufficiently healed I had one of your admirable rubber feet applied from measurements, and it fitted me as perfectly as though I had gone to New York and had the foot fitted. I have used the foot twelve years now, to the untold satisfaction of myself and the utmost gratification of my friends, who often tell me they would never notice anything peculiar about my walk. I have lived with people for months without their discovering that I was lame.

During the greater part of the time since I have worn your artificial foot I have attended a boarding school, with its usual number of stairs, which I have run up and down with the greatest ease.

Very gratefully yours,
Hattie L. MacGowan.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

Livingston County, Ill., July 11, 1896.

Mr. A. A. Marks:

Dear Sir:—My leg was amputated on January 14, 1895, and April of that same year I put on a leg made by you. After the first two or three weeks I wore the leg from the time I got up to going to bed at night. Last August, while away from home, I kept the leg on forty hours at a time very comfortably. Just a month ago people were very much surprised to see me without my leg: they asked me if it was broken; the fact was I took my leg off to ride a bicycle, the leg being amputated above the knee I considered the artificial would be in my way in riding a wheel. People that see me every day and know that I have an artificial leg say they can hardly realize it. My natural leg before amputation being stiff, and short about an inch and a half, I assure you I walk better now with my Marks leg than I did before. I am,

Truly yours,
Robert F. Allen.

INDIANA.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

Gibson County, Ind., Jan., 1896.

Mr. A. A. Marks:

Dear Sir:—I will have to say that the artificial leg you made me from measurements fits as perfectly as possible.

If I had come to the shop and you had taken the measurements yourself, I doubt that results would have been better.

I have worn it for about eight years. I put it on the next day after I got it,

and have worn it every day since, from early in the morning till late at night. My occupation is circular and band saw filer; I keep up all the saws for a large circular and band saw mill. I have to be on my feet most all day. I get around almost anywhere without a stick. As to the rubber foot, I think it is

No. 1209.

the finest thing out. It does not jar me when I make a misstep. I only have six inches of a stump, and I get around better than others I see that have worn other make of legs. JAMES M. PRITCHETT.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CASS COUNTY, IND., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I take pleasure in testifying to the satisfaction I have derived from the use of your artificial limb.

I have worn it nearly ten years. I have no hesitation in saying that your limbs are the simplest and the most useful that are made. Others have expressed the same opinion as myself. My limb was amputated below the knee January 20, 1886, and in about six months afterward I sent my measurement for a limb, which was made without my presence.

Yours respectfully,
W. ALBERT THOMAS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

DELAWARE COUNTY, IND., Jan. 26, 1896.

A. A. MARKS, ESQ.:

DEAR SIR:—I purchased an artificial leg of your manufacture, with the

patent jointless rubber foot, about thirteen years ago, and must say that it far exceeds its representations.

My leg was amputated just three inches below the knee-pan, and I went so long on what is called a peg leg that my stump was shaped badly, but I go just the same, regardless of these drawbacks; can skate on ice or roller skates.

Yours truly,

WM. H. ROBERTS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

GRANT COUNTY, IND., Dec. 16, 1895.

DEAR SIR:—I write you in regard to the artificial leg you made for me nearly eleven years ago. I consider it superior to any other leg I have ever worn; it has not been out of order since I got it. The lightness, easiness, and softness of the rubber foot, far excels any other leg I have ever seen. I am a broom maker, and our factory is one mile from town. I walk it twice a day, and don't tire. I have worn artificial legs for twenty-eight years.

Yours truly,

A. DENNIS

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WHITLEY COUNTY, IND., Dec. 18, 1895.

MR. MARKS:

DEAR SIR:—You made me a leg in 1879, and I wore it up to last fall. The new one I like better than the first. I have worn a —— leg, but I did not walk as well as I can with yours. My leg is amputated four inches above the ankle. My occupation a farmer; I weigh two hundred pounds.

Yours respectfully,

S. A. FLICKINGER.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

SPENCER COUNTY, IND., Dec. 17, 1895.

GENTLEMEN:—I received an artificial hand on the 9th of November, 1885. It was fitted in the city by A. A. Marks, and I have worn it ever since with satisfaction. I have had no repairs on it of any description. The rubber hand is light and durable, and can be used in holding light things. My occupation is that of a teacher.

I would not be without the hand for any price.

THOS. SAUNDERS.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

ELKHART COUNTY, IND., Aug. 5, 1896.

MR. A. A. MARKS:

DEAR SIR:—It is a pleasure to be able to speak of the merits of your artificial arms with rubber hands. My left arm was amputated five inches from the shoulder, and I purchased from you two years ago an arm. It has been in constant use since. I must confess that words cannot express the satisfaction and benefit I have derived from it. The cost of repairs during the two years is too small to mention. My occupation is that of freight conductor for the L. S. & M. S. Ry. I am yours truly,

A. E. WATSON.

INDIAN TERRITORY.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

CHEROKEE NATION, IND. TER., Jan. 3, 1896.

MR. A. A. MARKS:

DEAR SIR:—In July, 1884, I accidentally split my right knee-joint with an ax, which limb three days later was amputated four inches above knee-joint, leaving me an eight-inch stump.

No. 1210.

In January, 1886, I purchased my artificial leg of you, by sending measurements taken by one of my neighbors and myself. I am now compelled to say, that, after about ten years of constant use, I feel confident I made no mistake in taking your patent.

I often walk to church, over a mile, in company with others. My chief occupation is farming. I often saw wood all day, or I can pick a hundred pounds of cotton in a day, and that is about the amount I picked before my leg was amputated.

Yours truly,

J. D. CLUCK.

BELOW-KNEE AMPUTATION.

FORT SUPPLY, IND. TER., Feb., 1896.

A. A. MARKS, N. Y. City:

SIR:—I take pleasure in stating that the artificial leg with rubber foot which I received from you has given entire satisfaction. I consider it near perfection, compared with others I have worn. I am in the employ of the United States Government as guide and interpreter, and am in the saddle a great portion of the time.

I have as yet had no occcasion to have any repairs to the leg.

Yours truly,

AMOS CHAPMAN.

PARTIAL-FOOT AMPUTATION.

Fitted from Measurements.

VINITA, IND. TER., Jan. 1, 1896.

MR. A. A. MARKS:

DEAR SIR:—I am glad to testify in this way that your appliance with rubber foot for a Chopart's amputation is one of the finest articles I have ever seen. My foot was cut off by a mowing machine, August 4, 1891. I commenced using your aluminum leg with rubber foot last April and it has given entire satisfaction. I am a farmer by occupation and have walked as high as nine miles a day.

Respectfully yours,

F. L. CLINKENBEARD

IOWA.

ABOVE-KNEE AMPUTATION.

DALLAS COUNTY, IA., Oct. 29, 1887.

MR. A. A. MARKS:

DEAR SIR:—I have used one of your patent limbs for six years, and am well satisfied with it. I am a coal miner by occupation. I think that your rubber

No. 1211.

foot is a splendid success; it suits me. I never tried any other, nor do I wish to, as long as I can get one of your make. Mine is an upper amputation; I have nine inches of a stump; I can walk almost as fast as any ordinary man.

S. T. A.

ABOVE-KNEE AMPUTATION.

JEFFERSON COUNTY, IA., Dec. 17, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—It is now about seventeen years since I got your leg, and have worn it constantly since, and it appears to be perfectly sound and good yet, never having to be repaired, the rubber foot being firmly attached to the leg. The knee joint does not rattle or make any noise, and appears to be as good as when new, seventeen years ago.

I own a small piece of ground in this city on which I cultivate small fruit. I do all the hoeing, pruning, and a good part of the picking of the fruit.

I am a carpenter by trade, and work at the business when not engaged in my fruit garden. I climb up and down ladders when at work on houses.

R. STEPHENSON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CLINTON COUNTY, IA., Dec. 19, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn two different make of limbs, but neither gave me as good satisfaction as yours. I feel proud in recommending your limbs, as they are the best in the world. I am a great lover of sport, such as fishing and hunting, and can walk all day. My weight is two hundred pounds. I have worn one of Marks' limbs for over sixteen years, and it has never needed repairs. I had the measurements taken where I live.

Yours truly,

JAMES CARTER.

BELOW-KNEE AMPUTATION.

WAPELLO COUNTY, IA., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn your artificial leg for twenty-five years, and I regard your patent as first-class in every respect. I wore one leg fifteen years and it never cost me five cents. I should recommend A. A. Marks' legs above all others. My occupation is sewing-machine agent, and I am always on my feet, and the leg is never idle. I have gained from one hundred and thirty-five to two hundred and thirty pounds since I have been wearing the limb.

Hundreds of people in this part of the country don't know that I wear an artificial limb.

Yours with respect,

JAMES M. WELCH.

LEG BELOW KNEE.

Fitted from Measurements.

WINNESHIEK COUNTY, IA., Dec. 24, 1895.

MR. A. A. MARKS, New York City:

DEAR SIR:—I am wearing your artificial leg every day, and I get along first rate. I doubt that I shall ever want any but the rubber-foot leg. I have used others but did not like them.

Respectfully yours,

JOSEPH BUDKE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

POWESHIEK COUNTY, IA., May 19, 1896.

A. A. MARKS:

DEAR SIR:—The workmanship on your leg is perfectly satisfactory, and so is the fit. I have been wearing a leg with ankle and toe joints, which was continually getting out of order, thereby causing me much annoyance. I have seen many kinds of legs, but for neatness, comfort, and finish yours is far ahead of anything that has come under my observation.

Sincerely yours,

JOHN MCMULLAN.

KANSAS.

ABOVE-KNEE AMPUTATION.

SALINE COUNTY, KAN., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am very glad to put my stump on to brighten the fire. After having worn your artificial legs with the rubber feet for more than twenty-three years, I have no hesitation in saying it is the best leg in use; it is simple and the most durable of any of the many that I have seen. I would not use any other

No. 1212.

as long as I can get the rubber foot with stiff ankle; it never drags at the toe from weight of mud or other matter. It is so simple a child can adjust it.

I can heartily recommend the rubber foot as the most durable and easy to handle, and to any unfortunate one in need of such appliance, I would say by all means wear the rubber foot. I have worn artificial legs since 1862, and do all kinds of work.

I am a blacksmith, and shoe horses. I have dug wells and quarried stone, and other heavy work. I can walk farther in a given time than any man can on any other kind of a leg with the same length of stump as mine; it is only three inches from center of hip joint.

Yours, etc.,

E. LINCOLN.

BELOW-KNEE AMPUTATION.

ANDERSON COUNTY, KAN., Dec. 16, 1895.

A. A. MARKS, ESQ.:

A friend that was wearing one of your legs with rubber foot persuaded me to try your leg. Ten years ago I got you to make me one, and have worn it ever since, and have had no trouble with it; I would not take a leg with ankle joint as a gift, unless I wanted a leg and music box combined.

My leg is off five inches below the knee. I walk without a cane, and very few notice my being lame; I think I do as much walking every day as any man in our little city, and my leg never gets sore and has never been out of repair since I got it.

Very truly yours,

J. A. BELL.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

MONTGOMERY COUNTY, KAN., Dec. 19, 1895.

STATE OF KANSAS, }
County of Montgomery, }

J. C. Blair, being duly sworn upon his oath, deposes and says as follows:

I have worn artificial limbs about nine years.

I wore one manufactured by ——— of Independence, Kan., about eleven months, which was of but little service to me. It was too heavy, did not fit, and was continually getting out of order at the ankle joint, and was a great discomfort to me. I then sent measurements to A. A. Marks of New York city, and in a very short time received one of their artificial legs with rubber foot. I have worn it about nine years, and it has given satisfaction.

I have no fault to find, and believe that the rubber foot is the best in the world, and can be surpassed by none.

My leg is off four inches and a half below the knee.

I am in the real estate business in Kansas; can take care of my horses, harness and hitch them to buggy. I have walked as far as four and one-half miles at one time, while wearing Marks' artificial leg.

Signed, J. C. BLAIR.
Witness, CAPT. GEO. A. PECK.

STATE OF KANSAS, }
County of Montgomery. } ss.

Subscribed and sworn before me, a notary public, in and for said county and State.

J. C. BLAIR,
Notary Public.

BELOW-KNEE AMPUTATION.

RUSSELL COUNTY, KAN., Dec. 20, 1895.

A. A. MARKS:

SIR:—It is with pleasure I recommend your artificial leg, knowing by long experience that there is no other limb made that can give the satisfaction your artificial limb gives. I have been using your make for the last twenty-four years, and am well pleased with it. My occupation is farming. My limb is off from one and one-half inches below the knee joint. It has never cost me ten cents for repairs since I have been wearing your make of limb, and the rubber foot is just what makes your limb the best.

Hoping you success, I remain yours,

S. B. ANDREWS.

BELOW-KNEE AMPUTATION.

SUMNER COUNTY, KAN., Jan. 22, 1896.

MR. A. A. MARKS:

DEAR SIR:—I have worn one of your artificial legs for nine years.

I received one March 9, 1886; put it on the next day, but could not make much headway with it; but I kept trying and soon conquered it. I am a farmer and am on my feet all the time. It is entirely satisfactory.

Yours truly,

O. H. BENEDICT.

BELOW-KNEE AMPUTATION.

TOPEKA, KAN., Dec. 17, 1895.

I have worn one of your legs for a number of years. I find it durable and comfortable; have plowed, harrowed, and worked in the harvest. I am sixty-two years of age. I consider yours the best leg in the world.

ELIAS B. HELM.

ANKLE-JOINT AMPUTATION.

Fitted from Measurements.

TOPEKA, KAN., Dec. 16, 1895.

A. A. MARKS, ESQ. :

DEAR SIR :—I have worn an artificial foot since 1879. The point of amputation is at the ankle, with a portion of the heel remaining. It is a modification of Symes' operation.

I had great difficulty in getting an appliance, and I found it a point very difficult to supply with a comfortable and useful foot. I made many unsuccessful trials and about despaired ever being able to walk without the aid of a crutch. A friend advised me to apply to you, as he had some knowledge of the rubber hands and feet. I did so and received directions from you how to take measurements for the appliance. I sent on the measurements and soon received by express the limb and rubber foot. It was a perfect fit and was comfortable. I could walk with ease and with scarcely a perceptible limp.

I have worn this appliance since September, 1882, and without repairing it.

I am more than pleased with it, and know from experience that you are the only manufacturer of a comfortable and useful limb for the amputations known as Symes' or Chopart's. I am a physician, and see quite a number of people wearing artificial limbs, and am well satisfied that the limbs manufactured with the rubber hands and feet are far superior to any other.

Yours sincerely,

S. G. STEWART, M. D.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

KANSAS CITY, KAN., Jan. 22, 1896.

MR. A. A. MARKS :

DEAR SIR :—I have a left stump five and one-half inches in length, on which I wear one of your arms with rubber hand ; the same was fitted from measurements. I have worn it every day since 1881, and treble the amount of cost would not induce me to be without it. Repairs have been comparatively nothing. A new strap occasionally, that is all ; and, further, I know the rubber hand is far superior to any other I have ever seen in use. My hand is as good as the day I received it. I am a newspaper man by occupation. My arm keeps me balanced nicely, and fills the vacancy so perfectly that many people associating with me do not know that I am a one-armed man.

R. A. KOPE.

KENTUCKY.

ABOVE-KNEE AMPUTATION.

GREENUP COUNTY, KY., Dec. 17, 1895.

A. A. MARKS :

DEAR SIR :—I have worn an artificial leg made by you for twenty years. Having worn other makes of legs, I consider yours far superior for comfort to any other leg made, and the rubber foot is far ahead of any I have ever seen. My present occupation is a farmer, and I do all kinds of farm work. My leg is amputated about five inches above the knee.

Yours respectfully,

HARRISON RIGGS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CONCORD, LEWIS COUNTY, KY., Dec. 24, 1895.

MR. A. A. MARKS:

DEAR SIR:—Having worn one of your artificial limbs for eight years, I can inform you that I am more than pleased with it.

I am a farmer and can do almost any kind of work. I would not do without one of your legs for twice the value of it. The rubber foot is so natural; there is no rattling noise, and the step so soft and light. I recommend it to all in need of one as being the best.

Yours truly,

JOHN VANCE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

McCRACKEN COUNTY, KY., Dec. 17, 1895.

MR. A. A. MARKS:

KIND SIR:—I sent my measurements to you for an artificial leg about eleven years ago; it came in about two weeks after I ordered it. The fit was perfect. It has not cost a cent for repairs. I am more than pleased with the rubber foot, which works with perfect ease. I have worn artificial limbs for fifteen years, but have found none to suit me half so well as the one I have now.

Very respectfully,

DICK RUDY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

BOONE COUNTY, KY., July 7, 1896.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing one of your artificial legs going on six years, and it gives perfect satisfaction. I have seen several using other makes and I can walk away from them with ease. I do all kinds of farm work, and I make it a point to lead. The field and other hands follow, and when I buy another leg it will be of your make.

Truly yours,

G. E. LILLIA.

KNEE-BEARING AMPUTATION.

Fitted from Measurements.

LOGAN COUNTY, KY., Jan. 29, 1895.

MR. A. A. MARKS:

MY KIND SIR:—I have been for a long time desirous of writing and expressing my continued satisfaction with the artificial leg you made for me. It has been nearly five years since I obtained my artificial leg from you. I can walk very well without a cane or other support, and without your patent rubber foot my life would be miserable.

Respectfully yours,

WYETT T. CRAFTON.

LOUISIANA.

BELOW-KNEE AMPUTATION.

New Orleans, La., Dec. 31, 1895.

Mr. A. A. Marks:

Dear Sir:—After examining four different patents, I concluded that A. A. Marks' patent artificial leg was the one that came up to my wishes; and I can add that it has far exceeded my expectations. I have met acquaintances on the street who, not having heard of my accident, were astonished when I told them I was using an artificial leg.

I remain, with respect,

Mrs. S. Easton.

MAINE.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

Portland, Me., Jan. 9, 1896.

Mr. A. A. Marks:

Dear Sir:—I have worn one of your artificial limbs nearly twelve years. I think the rubber foot is a good thing, as it is perfectly noiseless.

I can vouch for your success in fitting from measurements.

My occupation is that of a carpenter, some parts of which have been very trying to an artificial limb.

Point of amputation, halfway between the knee and thigh.

Yours very truly,

Herbert W. Fickett.

ABOVE-KNEE AMPUTATION.

Penobscot County, Me., Dec. 16, 1895.

Mr. Marks:

Dear Sir:—Your first artificial leg I wore for years. Your last one I got in January, 1886, and have worn it with perfect ease every day.

My weight is 180 pounds. My business is farming, driving teams, which is all laborious work. I am very sorry to say that once in a while I visit the ball-room, and the ladies all wonder how I can get around so nicely on an artificial limb.

Yours respectfully,

A. O. Wing.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

Waldo County, Me., Dec. 17, 1895.

Mr. A. A. Marks:

Dear Sir:—I can say of the merits of your leg that it is the best the Government provides for its soldiers. My first leg was made by Dr. ——. The leg was a source of trouble to me. I was most of the time with a broken leg, and had to wear a peg leg of my own make.

I have worn an artificial leg for 31 years. Eleven years ago when I applied to you for a leg, you sent me blanks for measuring; I took my own measurements and sent them to you.

As soon as I received the leg I put it on, and have worn it ever since; that was twelve years and a half ago; it fits me the best of any leg that I have ever had. I am a farmer and have some hard work.

Yours truly,

Wm. J. Brown.

BELOW-KNEE AMPUTATION.

KENNEBEC COUNTY, ME., Jan. 1, 1896.

MR. MARKS:

DEAR SIR:—I am well pleased with your make. My leg is off five inches below the knee, and I have worn it for nine years. I expect to have another of your make very soon.

Respectfully yours,

FRANCIS SLAIGER.

BELOW-KNEE AMPUTATION.

Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—The artificial leg you made for me gives good satisfaction, and I don't think there is any other foot made as good as the rubber foot. I have my leg going on eleven years, have had no repairs done to amount to anything. I am a miner, and the work is very hard, but my leg has stood the work well, and I can't see but that it is as good now as ever.

Yours, etc.,

Kennebec County, Me. EUGENE FITCH.

BELOW-KNEE AMPUTATION.

LINCOLN COUNTY, ME., Dec. 17, 1895.

A. A. MARKS:

DEAR SIR:—I have worn your rubber foot ten years, and like it so well I would wear no other. My business is that of a stone-cutter, and I am obliged to stand all day. I am very hard on an artificial leg, yet this one has cost me nothing for repairs, and I walk very comfortably with it. My leg is amputated three inches above the ankle joint.

Truly yours,

E. Y. BRYANT.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I can say for one that your leg is the best leg that is made. I have worn the ankle joint leg. Every little while I had to put in new cords. The noise it made was unbearable. But it isn't so with your rubber foot, which is firm and solid.

I am a laborer, and I work on my leg every day. I have worn artificial legs for thirty-two years. I am,

Yours respectfully,

W. H. THOMAS.

Waldo County, Me.

BELOW-KNEE AMPUTATION.

WASHINGTON COUNTY, ME., Dec. 18, 1895.

MR. MARKS:

DEAR SIR:—The leg you made for me over ten years ago is almost as good as the day I got it. It is the best leg that I ever wore.

I have been wearing artificial limbs since 1864, and have had many different makes, but I must say your make is the best.

Your legs do not get out of repair as the others do. It used to cost me a great deal to keep the other different makes in repair. Since I have worn your new patent leg I have not been laid up with chafing one day. Of

the other makes I never had but one that would not chafe my stump and lay me up.

I like your rubber foot very much and would have no other make.

I have the best fit from you that I ever had. I am a sealer by trade. I work in a sardine factory, and I can make my rubber foot get around with the best of them.

Yours,

HUGH THOMPSON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

YORK COUNTY, ME.

MR. MARKS:

Having worn one of your artificial legs for twenty years, I can truly say they are the best that I have ever seen.

The rubber foot is a marvel of neatness and durability, and I could not wear any other. I wear it with ease and comfort, and have paid but a very small sum for repairs. I do all my housework and go in and out of doors without canes.

Yours very respectfully,

MRS. S. E. SILLEY.

PARTIAL FOOT AMPUTATION.

PORTLAND, ME., Dec. 16, 1895.

MR. MARKS:

DEAR SIR:—Your aluminum leg combined with the rubber foot is the neatest and best I have ever used. I have used two different rubber feet with wood artificial legs, but I would rather have one aluminum leg than six wood artificial legs for ease and lightness. My occupation is shoemaking, which requires good feet, because I have to stand all day at one part, and I have to run large rollers with treadles, both steam and foot power.

Yours respectfully,

JOHN EDWARD FRATES.

MARYLAND.

RIGHT LEG AMPUTATED IN THE KNEE, AND LEFT BELOW THE KNEE.

Fitted from Measurements.

BALTIMORE, MD., April 1, 1896.

MR. A. A. MARKS:

DEAR SIR:—I run the electric plant for the Luray Caves and get along so well on my limbs that I forget at times that they are any other than my natural limbs. I can work at my trade and am able to do my own firing and take charge of the whole electrical plant, which is no small one. I have forty-six arc lights and over three hundred incandescent lamps. I have to climb and carry a ladder through the caves every day to trim my arc lamps, and my boss says I am as much a curiosity as the Caves. I am at Luray from April 10 until December 1, and would be pleased to have anyone call on me in reference to your limbs, for they are undoubtedly the best in the world. I run as engineer on a boat in a friend's place who was sick this winter, and the captain did not know that I wore two artificial limbs until I told him when I left. I was there three months.

Address all mail to Luray, Page Co., Va.

Respectfully yours,

Engineer of Power House. HARRY E. HOHN.

BOTH LEGS AMPUTATED BELOW THE KNEES.

BALTIMORE & OHIO RAILROAD COMPANY,
Sup't of Motive Power Office, Dec. 16, 1895.

MY DEAR SIR :—I am just in receipt of your favor on the 14th inst. In reply would say that your work has been entirely satisfactory to me, and that I never lose an opportunity to recommend your goods. You are at liberty to use this letter in your revised book of Treatise on artificials, and it will give pleasure to answer inquiries in connection therewith.

Thanking you for past kindness, I am,

Yours truly,
HENRY M. ETCHISON, Baltimore, Md.

BOTH LEGS AMPUTATED BELOW THE KNEES.

BALTIMORE, MD., Dec. 16, 1895.

A. A. MARKS :

SIR :—You will excuse me for writing to you, but it cannot be prevented, because the young man and I for whom you made the legs are so much pleased that we cannot recommend any other make. Just think, I am a sick man, but I can walk nearly every day five miles with ease. I have worn your patents for over six years, and with a little care will wear them as much longer.

Respectfully,
CHAS. KRIDENOFF.

ABOVE KNEE AMPUTATION.

ALLEGANY COUNTY, MD., Dec. 18, 1895.

MR. A. A. MARKS :

DEAR SIR :—Having lost one of my legs on the railroad some years ago, I applied to you for assistance, and received one of the most valuable limbs made. I consider Mr. Marks' limbs without a rival.

Yours truly,
JOHN HENRY PAUL.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

GARRETT COUNTY, MD., Feb. 5, 1896.

MR. A. A. MARKS :

DEAR SIR :—In 1883 I purchased one of your limbs, and I commenced wearing it shortly after getting it, and have worn it every day since. I was very prejudiced against the stiff ankle at first, but after a little patience I got along better than I ever expected to. The leg has far exceeded my expectations.

It has proved to be just what Mr. Marks said was the beauty of the limb : it does away with a lot of machinery that I have seen in other artificial limbs. It is not accompanied with rattling or an unpleasant noise when walking ; there are no springs, hinges, or bolts to get out of order. My leg has not cost me but twenty-five cents for repairs in four years. I have given it some hard trials ; I have done a great deal of walking ; people have been surprised when I told them I wore an artificial limb.

Yours truly,
P. CLINE.

ABOVE KNEE AMPUTATION.

Fitted from Measurements.

BALTIMORE, MD., Dec. 17, 1895.

A. A. MARKS :

DEAR SIR :—I had my leg amputated above the knee twenty-nine years ago, and directly after I got one of your limbs, which lasted me fifteen years with

very little expense. I have only had two of your limbs in twenty-eight years, and it cost me but a trifle in that time for repairs. As to the rubber foot, it cannot be excelled. I would have no other, and never will have any other. I must say that as to measurements and fittings I have never had any trouble. Both my legs were fitted from measurements. My occupation for the last twenty years has been the grocery business. This business is laborious for one who undertakes to load and unload wagons, as I am frequently called upon to do. In fact, I might say that I do everything that is required of me, the same as others with natural limbs.

It is no task for me to climb ladders, which I had to do when I had men building for me.

Yours respectfully,

JEREMIAH KEADY.

ABOVE-KNEE AMPUTATION.

BALTIMORE, MD., Dec. 23, 1895.

A. A. MARKS, New York City:

DEAR SIR:—I have been wearing an artificial leg since December 10, 1880. It is an excellent fit, and well shaped; it seems to be as strong as the day I received it.

I have been engaged at manual labor most of the time (repairing furniture and upholstering). My amputation is above the knee, with about six inches of stump.

I am respectfully yours,

P. J. COLE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Dec. 18, 1895.

I am by occupation an accountant, and put to pretty hard tasks, such as standing half the time and walking a distance of three miles twice a day. I have worn Marks' artificial leg for nine years.

I remain yours truly,

Baltimore, Md. WILEY S. DEVORE.

BELOW-KNEE AMPUTATION.

BALTIMORE, MD., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—The artificial leg that you made for me has given me so much satisfaction that I would not part with it for any consideration. It has been praised so highly that I get tired of listening to people commenting on it. I have danced on it without any inconvenience. It took me but a short time to break it in and caused me but little trouble. I was only too glad to dispense with my crutches.

I am, dear sir, yours, etc.,

CAPT. W. E. HARTLOVE.

BELOW-KNEE AMPUTATION.

Dec. 26, 1895.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—I have been wearing one of your legs for nearly ten years with perfect satisfaction. For the last nine years I walk to and from work (three miles each way), and often as far at night, without feeling tired.

Yours ever,

Baltimore, Md. R. E. WARD.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Dec. 23, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am still wearing the leg you made me about seventeen years ago. I wear it every day and work at my trade—shoemaking. I think your patent leg is the most durable that is made. My weight is 224 pounds, and I have carried three bushels of wheat on the leg. I think I know the difference between artificial legs, for I have worn several kinds.

Yours truly,

CYRUS RIDENOUR.

Washington County, Maryland.

BELOW-ELBOW AMPUTATION.

DORCHESTER COUNTY, MD., Dec. 18, 1895.

A. A. MARKS:

DEAR SIR:—In the year 1881 I lost my arm. I have about half of the fore-arm left, and with the use of one of your artificial arms I astonish all. My occupation is steam-fitting, and I can do anything that is done in saw mills,—file, saw, fire, engineer, and anything you could mention.

I have been using the arm for eleven years constantly, I don't know of any better and don't want to. Mine cost $50. I would not be without it for twenty times fifty.

I cannot tell anyone how much advantage it is to me. People wonder how I file circular saws and do so many other things. Take away my arm and hook and I feel as much at a loss as when I first lost my hand.

J. F. WHEATLEY.

MASSACHUSETTS.

ABOVE-KNEE AMPUTATION.

BOSTON, MASS., Dec. 31, 1895.

MR. A. A. MARKS:

DEAR SIR:—In April, 1886, I was injured at Somerville, Mass., by a runaway horse, so that amputation was necessary five inches above the knee, and in November, 1886, began to wear your artificial leg, and have not missed a day in wearing it since the first day I had it. I am a carpenter by trade, and in May, 1887, just twelve months after being hurt, began to work at the bench and have worked there ever since. I walk to my work, and stand all day, and am not any more tired at night than if I had both my legs. Without it I could do nothing, but with it can get along almost as well as before I lost my leg.

Yours very truly,

CHARLES C. MOULTON.

ABOVE-KNEE AMPUTATION.

NORFOLK COUNTY, MASS., Jan. 6, 1896.

A. A. MARKS:

DEAR SIR:—I am a hard-working farmer, and have worn your artificial limb for over twenty-five years, and still prefer it to any other make. I tried several kinds, but never found one that could compare with yours either in durability or comfort.

Very truly,

CHARLES A. SARGENT.

ABOVE-KNEE AMPUTATION.

PLYMOUTH COUNTY, MASS., Dec. 18, 1895.

DEAR SIR :—I have used one of your artificial legs with the rubber foot, for amputation above the knee, for the last nine years, and it has proved satisfactory. Very respectfully,

JOHN WASHBURN.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

SUFFOLK COUNTY, MASS., Nov. 8, 1895.

A. A. MARKS, ESQ.:

DEAR SIR :—I have been wearing one of your artificial limbs for nineteen years, and I feel as though I ought to thank you for your great invention. I had my leg amputated just above the knee, and thought I should be useless the rest of my life, but if you could see me go about my house and do the work for a family of five you would be astonished.

Yours, very respectfully,

MRS. I. KIERSTEAD.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

SOMERVILLE, MASS., Dec. 16, 1895.

A. A. MARKS :

DEAR SIR :—My daughter, fifteen years old, has been wearing the artificial leg furnished by you about eight years, and I am pleased to say that it has given entire satisfaction.

Although the amputation was above the knee, and the little patient had not used the limb for more than three years previous to its amputation, she was able (greatly to our astonishment) to walk across the room *without a cane* within an hour after the application of the artificial. I consider the rubber foot the best substitute for the natural one that can be provided.

Yours very truly,

GEORGE C. BECKWITH.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Dec. 17, 1895.

MR. A. A. MARKS :

DEAR SIR :—I have worn one of your artificial legs for the last eleven years, and my work is of such a nature that it necessitates my standing or walking nearly all day. I would say that it has not cost me a cent for repairs since I purchased it, and it is likely to last a number of years yet.

DANIEL MURPHY,

Berkshire County, Mass.

BELOW-KNEE AMPUTATION.

BERKSHIRE COUNTY, MASS., Dec. 16, 1895.

MR. A. A. MARKS :

DEAR SIR :—I have worn an artificial limb for thirty years. The first five years I wore one with a wooden foot and ankle joint.

I have worn yours twenty-five years.

When I laid aside the one with the wooden foot and put on one of yours I felt that I was nearly a sound man again.

Yours truly,

J. H. ADAMS.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have used two artificial legs with ankle joints and have had no comfort with them. But since I got your rubber foot, October, 1886, I am able to run and walk. I weigh 235 pounds, and I have had a great deal of walking to do.

Yours with respect,

ROBERT KENNEALY.

Boston, Mass.

BELOW-KNEE AMPUTATION.

HAMPDEN COUNTY, MASS.

A. A. MARKS:

DEAR SIR:—I have mailed you to-day a photograph of myself on a wheel. I have worn a Marks leg for a great many years, and can do most anything

No. 1213.

with it. I ride from fifteen to twenty miles almost every day on the wheel, and have ridden forty. I have walked thirteen miles without hardly a stop. Have used a leg with an ankle joint, but find the Marks leg the best.

Yours very truly,

FRANK H. SMITH.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am happy to state that I still wear the leg you made for me in 1880, and it is in good order yet. I am using it every day.

I have only paid seven dollars in repairs, so far, in all. I have worn legs made by other manufacturers, with wooden feet, and ankle joints, but in all my years of experience I never found myself satisfied until I procured one of your artificial legs with the rubber foot. I walk more naturally and more comfortably than I ever did on the other legs that I have worn. My work is very laborious, as I have to stand on my feet sixteen hours a day, lifting barrels, and climbing up and down stairs constantly every day. I have worn artificial legs now fifteen years. I have walked a mile inside of ten minutes.

Respectfully yours,

JOSEPH H. SYLVESTER.

Boston, Mass.

BELOW-KNEE AMPUTATION.

Rockingham County, Mass., Mar. 3, 1895.

Mr. A. A. Marks:

Dear Sir:—It gives great pleasure to assure you that the apparatus made by you in 1876 has answered my expectations, enabling me to walk in a natural manner and leave the crutch.

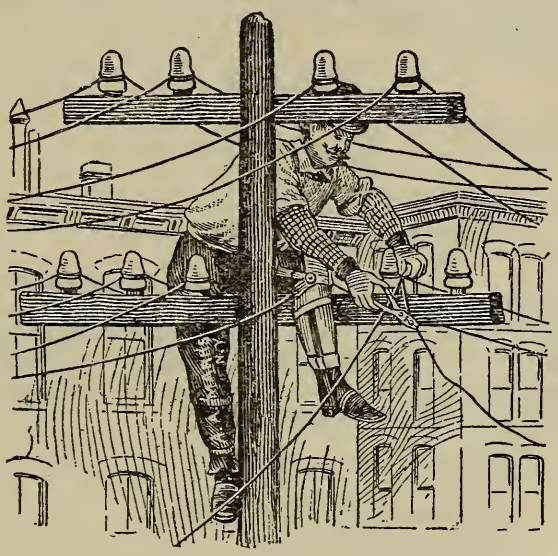
My parish work calls for a great deal of walking, which I can do with great ease. Hoping many others may find, as I have, the value of your great work, I remain. Respectfully,

Rev. Rufus P. Gardner,
Pastor of First Congregational Church.

BELOW-KNEE AMPUTATION.

Everett, Mass., Dec. 26, 1895.

Alvah Young, employed by The Edison General Electric Co., New England Division, 38 Pearl Street, Boston, Mass., as a lineman, is a living example of the remarkable degree to which rubber feet restore lost members. He



No. 1214.

lost one of his legs some years ago in a railroad accident. He had a Marks rubber foot and artificial leg applied, and since then has engaged in active manual labor, earning his livelihood. He will climb a pole as dexterously as any of his associates, hold himself on the cross-bar with his artificial, and place the wires in a thoroughly workmanlike way.

BELOW-KNEE AMPUTATION.

Franklin County, Mass., March 25, 1896.

Dear Sir:—Immediately after getting your leg, April, 1884, I went to work in a cheese factory, and worked seven months, and never lost one day, and ever since then my occupation has been cheese-making. From the first the leg has never given me any trouble. I walk with safety and comfort. I walk very much, and labor constantly. I have seen other kinds, but I prefer yours to any other.

Yours respectfully,

Myron D. Searles.

BELOW-KNEE AMPUTATION.

Dec. 31, 1895.

MR. A. A. MARKS:

DEAR SIR:—After five years' experience with three artificial legs with ankle joints from well-known makers, and twenty-five years' constant use of the rubber foot, I can honestly recommend the rubber foot as the *best*, being simple in construction, firm, natural and easy in motion.

J. W. FARNSWORTH.

Middlesex County, Mass.

BELOW-KNEE AMPUTATION.

Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn the artificial leg you made for me for over eighteen years, during which time I have worn no other.

I am now thirty years old. I went to school until I was eighteen. Running, playing ball, skating, and dancing were the sports I frequently indulged in. Your rubber-foot leg enabled me to do this and keep everyone in ignorance as to my condition.

I have been working in a shoe shop in Brockton for twelve years and stand on my leg ten hours a day.

Yours truly,

VICTOR P. BEAUREGARD.

Plymouth County, Mass.

BELOW-KNEE AMPUTATION.

BERKSHIRE COUNTY, MASS., Dec. 24, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn one of your legs for sixteen years and it has given me perfect satisfaction. The rubber foot gives more of a natural step—elastic. I can walk farther and easier than with any other kind. I can go on the floor and dance with the best of them with good limbs.

Yours,

W. M. FIELD.

BELOW-KNEE AMPUTATION.

WORCESTER COUNTY, MASS., Dec. 17, 1895.

MR. MARKS:

I can walk one mile or two with ease on the leg you made me 1886. It is all right, and I am well pleased with it.

It is off below the knee.

EMULUS HARWOOD.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WORCESTER COUNTY, MASS., April 5, 1896.

A. A. MARKS:

DEAR SIR:—My foot was amputated at the ankle joint, about seventeen years ago, I received a rubber foot from you, fitted by measurements. It fits perfectly. I work in the woolen mill. I am perfectly satisfied.

Yours truly,

ALEXANDER ALLEN.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WORCESTER, MASS., Dec. 16, 1895.

A. A. MARKS, 701 Broadway, N. Y.:

DEAR SIR:—Having now worn the artificial leg procured from you, I can say that after an experience of over twenty years with different makes yours with the rubber foot is the most comfortable I have ever worn, and as it was fitted from measures, and without any alteration whatever, I thought it phenomenal. I have not expended a cent for repairs, and it is as good as the first day I put it on. I am on my feet most of the time in the iron business.

Yours respectfully,

JAMES P. CROSBY.

BELOW-KNEE AMPUTATION.

Dec. 17, 1895.

MR. MARKS:

DEAR SIR:—My leg is a great deal better than I ever expected. I can do very nearly as well with it as I could with my own leg.

Yours respectfully,

Worcester County, Mass. WILLIS A. TAFT.

ANKLE-JOINT AMPUTATION.

Fitted from Measurements.

MIDDLESEX COUNTY, MASS., Dec. 25, 1895.

MR. MARKS:

DEAR SIR:—I have worn one of your artificial limbs for eleven years. I think your rubber foot the best thing in the market, and far more durable than the old style.

Yours respectfully,

O. F. STONE.

ANKLE-JOINT AMPUTATION.

Fitted from Measurements.

NORFOLK COUNTY, MASS., Dec. 18, 1895.

A. A. MARKS:

DEAR SIR:—I have worn an artificial limb for twenty years. I have worn one of another kind that had the ankle joint; it was worn out in three years; and I purchased one from you.

I wore it seven years; it cost me $1.50 for repairs. Ten years ago I purchased another limb from you. I think it is the best limb that is made. I would not be without one. I am a wool sorter and have to lift and truck bales that weigh from one hundred to one thousand pounds. My limb is amputated at the ankle joint.

Respectfully yours,

JOHN W. SMITH.

INSTEP AMPUTATION.

FRANKLIN COUNTY, MASS., March, 1896.

MR. A. A. MARKS:

DEAR SIR:—I desire to inform you that the artificial leg you made for me in 1886 has given me entire satisfaction.

You have my regards for the service you have done me.

Respectfully yours,

JOSEPH PERINET.

APPARATUS.—NO. 808 FOOT.

BRISTOL COUNTY, MASS., Dec. 30, 1895.

A. A. MARKS:

DEAR SIR:—I have worn the foot steadily for over eight years and don't think it can be improved. I feel very grateful that you and your workmen have been gifted with the spirit of wisdom to know what would suit me so well. I am, yours respectfully,

BELLE T. GRAY.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

BARNSTABLE COUNTY, MASS., Dec. 21, 1895.

MR. A. A. MARKS:

DEAR SIR:—The artificial arm purchased of you eleven years ago has given good satisfaction. I am a farmer by occupation, and the arm has been in hard and constant use with very few repairs except straps and webbing. The stump of my arm is but six inches long, but the arm fits well, and is all one could expect of an artificial limb, and I can heartily recommend them.

Yours truly,

CHAS. L. DEWEY.

BELOW-ELBOW AMPUTATION.

ROXBURY, MASS., Dec. 16, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—I have been wearing one of your rubber hands for about ten years. It has been of such assistance and use to me that I would not be without it for a day. I am able to help myself at table and in many other ways.

Yours truly,

JOSEPH T. MOONEY.

NO. 784 EXTENSION.

GROTON, MASS., Dec. 17, 1895.

A. A. MARKS:

DEAR SIR:—I am very much pleased with the aluminum artificial leg made by you. I find it satisfactory in every respect, being strong, light, and neat. I strongly recommend it to all who are in need of such an apparatus.

Very truly yours,

EDWIN H. CLARK.

MICHIGAN.

ABOVE-KNEE AMPUTATION.

GENESEE COUNTY, MICH., Dec. 19, 1895.

MR. A. A. MARKS, New York City:

With pleasure I indorse the rubber foot as the best artificial foot manufactured. In my opinion it has no equal for durability and stillness, and for my use is far ahead of any ankle joint limb I ever saw: and I have seen a good many different men's make and worn one about two years which cost me $50 for repairs. The limb I am wearing now was made by A. A. Marks and I have been wearing his leg for over twenty years.

Yours truly,

WM. H. MEAKER.

ABOVE-KNEE AMPUTATION.

CLINTON COUNTY, MICH., Dec. 16, 1895.

DR. MARKS:

DEAR SIR:—I thought I would write you a few lines in regard to the artificial limb you made for me. I can say it is a perfect limb, both in ease of walking and fit. I can walk so much better than I could with the loose ankle flopping foot that I used to wear. After wearing a limb since 1864 I am able to judge, and am prepared to state that your limb is better than any other make.

Very respectfully,

JOHN N. GILBERT.

KNEE-BEARING AMPUTATION.

BRANCH COUNTY, MICH., Dec. 22, 1895.

A. A. MARKS, ESQ., New York:

I have worn artificial legs for thirty years; have during that time worn out two, and have had the third one now eleven years, this last one being of your make. I regard the one I am wearing now as being far superior in many ways to the other two. I wear what is termed a knee-bearing leg.

Your make of leg gives me a better gait in walking than the others.

I would state that I regard the rubber foot as being one of the greatest improvements in artificial limbs. I am a country merchant and actively engaged in the details of my business. CHARLES CARROLL.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

BAY CITY, MICH., Dec. 19, 1895.

A. A. MARKS:

DEAR SIR:—I take pleasure in assuring you that the artificial leg you made for me from measurements, now seventeen years in use, is in every way satisfactory to me. It is far superior to any I have ever seen. I work in a saw-mill. I wear it from morning till night, week in and out.

Yours respectfully,

JOHN STEWART.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CHIPPEWA COUNTY, MICH., Dec. 17, 1895.

MR. A. A. MARKS, New York City:

DEAR SIR:—As soon as you sent me the blanks I had my leg measured and ordered an artificial one. I can assure you that I am more than pleased with it. My leg is cut off about six inches above the ankle. I am an engineer on a steamboat by occupation, but I am now foreman of public works, where I have to be constantly on my feet, and I am sure had I not your rubber foot I could not have stood the fatigue. I can lift, jump, run, and walk as fast as most any ordinary man. I am fifty-eight years old.

Yours,

J. R. COOK.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Dec. 19, 1895.

A. A. MARKS:

DEAR SIR:—My limb was taken off below the knee. I took my own measurements and sent for your patent limb; got it all satisfactory in

February, 1869, and have worn it ever since. I never had any repairs on it only what I could do myself.

My work is all kinds of farm work. If I thought I could not get another limb, money could not buy this old one.

Yours with respect,

Gratiot County, Mich. L. H. NORRIS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

IONIA COUNTY, MICH., Dec. 17, 1895.

MR. A. A. MARKS:

The leg I got from you I am well pleased with.

It was a first-class fit. I have worn it two years and a half, and it is in good condition yet. I can recommend that your limb with the rubber foot is much easier than a wooden one. Yours truly,

HIRAM GIBSON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

KENT COUNTY, MICH., Dec. 7, 1895.

MR. MARKS:

DEAR SIR:—I have been wearing your patent artificial leg nearly three years, with the utmost satisfaction. My occupation is farming. I have been to no expense since purchasing it. Yours truly,

JAMES E. JOHNSON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

OAKLAND COUNTY, MICH., Jan. 10, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am very well pleased with my leg, as I have had it about fifteen years or more, and it has given perfect satisfaction in every respect. I am a farmer, and can do all the work required of a man on a farm.

Yours with respect,

ADAM HEMSTEAD.

BELOW-KNEE AMPUTATION.

OAKLAND COUNTY, MICH., Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing your artificial leg for nearly twenty-five years. I have no occasion to find fault with it. The rubber foot in my judgment is the best in the market. I especially recommend it for its simplicity and durability, compared with the old style. I have worked at my old business, as a farmer, ever since I got your leg.

Yours very respectfully,

CHARLES HIBNER.

ANKLE-JOINT AMPUTATION.

GOGEBIC COUNTY, MICH., Dec. 16, 1895.

DEAR SIR:—Your aluminum leg is good and strong and light. My occupation now is an engineer, and I can get around as good as ever. I do not use a cane and can highly recommend your leg to anyone who is in need of one. In fact, you could not tell I had one. Yours,

JOHN DOWNEY.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

KENT COUNTY, MICH., Dec. 26, 1895.

A. A. MARKS :

DEAR SIR :—The artificial arm I bought of you ten years ago is in every way satisfactory. The rubber hand is of special benefit. I would not have any other kind of hand. I have only five inches of stump ; was fitted by measurements sent by mail ; don't think it possible to have a better fit.

Very respectfully,

C. S. PARKS.

MINNESOTA.

BOTH LEGS AMPUTATED BELOW THE KNEES.

SCOTT COUNTY, MINN., Oct. 13, 1895.

MY DEAR SIR :—My limbs you made for me are giving the best of satisfaction ; they are more than you claimed. I can walk up or down hill without a cane, in fact I don't use a cane at all.

Yours respectfully,

J. B. FITZSIMMONS.

To A. A. MARKS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WASHINGTON COUNTY, MINN., Dec. 28, 1895.

A. A. MARKS, ESQ.:

DEAR SIR :—I have worn an artificial leg made by you for nearly ten years. My leg is amputated about six inches below the knee.

I am very well pleased with it. My occupation being farming, I can do very nearly as much work as before losing my leg.

Yours truly,

S. J. ORR.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WABASHA COUNTY, MINN., July 16, 1894.

A. A. MARKS :

DEAR SIR :—I have had two other legs and never had such comfort with either as with your manufacture. I am,

Respectfully yours,

GERTRUDE E. FLYNN.

ABOVE-ELBOW AMPUTATION.

WILKIN COUNTY, MINN., Jan. 26, 1896.

A. A. MARKS :

DEAR SIR :—I received my artificial arm in good condition. I like it very much. It gives me great satisfaction. For the first time in four years I have been able to do almost any kind of farm work.

Respectfully yours,

N. O. GRONSETH.

MISSISSIPPI.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

COPIAH COUNTY, MISS., Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been using one of your patent artificial legs for over fourteen years, and I have found it to be all you claimed it to be. I have done a great deal of heavy work on my farm since I have been using your artificial leg. My leg fits well. It has given perfect satisfaction.

THOMAS GRAVES.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

NATCHEZ, MISS., March 18, 1896.

MR. A. A. MARKS:

DEAR SIR:—I wish to let you know how well pleased I am with my leg; it has given entire satisfaction. A man who has never worn one of the ankle joint traps cannot fully appreciate the Marks leg. For eleven years I wore an ankle joint leg, and was never for more than a few days at a time free from suffering—it almost ruined my stump. I am happy to say that I have not had one of the old sores since I commenced using the Marks leg; the rubber foot is a wonder. Very sincerely yours,

G. L. WOOD.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

MONROE COUNTY, MISS., Nov. 15, 1895.

MR. A. A. MARKS:

DEAR SIR:—I suppose you are aware of the fact that I have been wearing

No. 1215.

one of your artificial legs for over four years; I think myself the best one-legged man in Mississippi from the simple fact that I am wearing one of your

artificial limbs. I am a barber by trade, I stand at my chair fourteen to sixteen hours each day and work hard. I have won two races here on my bicycle; I can ride as far as any man in town and just a little faster. This is my first opportunity to tell you what I think of your limb. I remain,

Your faithful patient,

L. A. CARROLL.

MISSOURI.

ABOVE-KNEE AMPUTATION.

PHELPS COUNTY, MO., Dec. 18, 1895.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—I take great pleasure in recommending your artificial limbs, especially for their durability and superiority of the rubber foot over all others. My left limb is amputated just above the knee joint. I have worn one of your limbs since April, 1884, and it has not cost me one cent for repairs to this date; I walk easily without a cane, and have no difficulty in following my profession. Very truly yours,

J. D. CARPENTER, M. D.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

BARRY COUNTY, MO., Dec. 17, 1895.

FRIEND A. A. MARKS:

I have thoroughly tested your legs to my greatest satisfaction, in all kinds of weather. Their durability cannot be questioned, and your success in fitting and measuring has proven excellent. I can cheerfully recommend them to one and all. Yours respectfully,

J. A. GRAYSON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

FRANKLIN COUNTY, MO., Dec. 19, 1895.

MR. A. A. MARKS, New York:

DEAR SIR:—I have been using artificial legs for twenty-two years, and have had one from several factories, but none so well pleased me as yours. It was made by measurement, which proved satisfactory. I have used yours eleven years, and no repairing. I use it every day. The rubber foot is more durable than any other. Respectfully,

ROBERT H. HOFFMANN.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

ST. LOUIS, MO., June 17, 1894.

MR. A. A. MARKS, New York:

DEAR SIR:—I wear my artificial leg all day and I have lots of walking to do; I do it nearly as easily as before I lost my leg. The rubber foot seems quite natural; I like it better every day. Yours truly,

JOHN C. EVANS.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

DUNKLIN COUNTY, MO., July 14, 1896.

DEAR SIR:—I have been wearing one of your make of artificial arms for two years and I can do almost as much labor with it as some people do with

their natural arms. I am clerking in a store, handling all kinds of heavy merchandise, I can wheel a wheel-barrow or hold a plow. I am well satisfied with my arm. (See cut No. 1103.) I am,

Yours truly,

A. A. MARKS. W. C. BRAY.

MONTANA.

BELOW-KNEE AMPUTATION.

SWEET GRASS COUNTY, MONT., Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—The rubber foot you applied to my artificial leg gives me better satisfaction than I ever had with the ankle joint. I am now sure-footed, which I never was with the other. Yours,

JNO. M. DODGE.

KNEE-BEARING AMPUTATION.

JEFFERSON COUNTY, MONT., April 10, 1893.

A. A. MARKS, ESQ.:

DEAR SIR:—In regard to my experience in using an artificial leg will say that I have worn an artificial leg thirty-one years.

The first rubber foot I wore for twelve years, and the second to date. The rubber foot cannot be any more and be artificial. It gives a soft-like, safe step.

No. 1216.

I am a stone mason and builder. My work is on rough ground, with spall, fragments, and rubbish as usually seen about stone buildings while under construction. This is the place to test an artificial leg. No other leg ever did so much good. I will give a few rough ideas of the common sense of it. 1st, it has a stiff ankle joint which, though apparently a disadvantage, is really its charm.

I can stand on the heel or toe at will; this gives me great advantage in turning about and getting around lively. The joint will flap on all other legs as soon as a little weight is applied to them. They will then be flat on the ground, and it will be impossible to turn until the weight is relieved.

If on a sidehill, roof, or ladder the joint is not safe, but the rubber foot is

always safe. Any person wanting to know about your limb I will cheerfully answer all communications if a P. O. stamp is inclosed.

Respectfully yours,
GEO. D. KERNS.

BELOW-KNEE AMPUTATION.
Fitted from Measurements.

FERGUS COUNTY, MONT., March 8, 1896.

MR. A. A. MARKS:

DEAR SIR:—The artificial leg received from you works splendidly, almost like a human limb. The rubber foot I consider a great improvement over the old one. Yours,

W. E. ADAMS.

NEBRASKA.

ABOVE-KNEE AMPUTATION.
Fitted from Measurements.

POLK COUNTY, NEB., Aug. 7, 1896.

MR. A. A. MARKS:

DEAR SIR:—This is to certify that in January, 1895, I purchased from you an artificial leg for a thigh amputation. Although being a man of 220 pounds' weight, I can truthfully say that I have not missed using it a day on account of any misfit or defect in workmanship. It is perfectly easy, being free from the annoying rattle that was connected with the other limbs which I have worn. Yours very truly,

HARVEY C. BEEBE.

ABOVE-KNEE AMPUTATION.

BUTLER COUNTY, NEB., March 3, 1896.

DEAR SIR:—After wearing a limb for eighteen years I know how to appreciate one. Your foot movement is so noiseless and easy that I'd not think of going back to my old style. At first I thought I *never* could use it, but in a very little while I found I could. It has grown better and better right along. And now rather than go back to the old style I'd pay you $50 a year just for the use of yours, and I'm not rich either. Again, it pleases my friends; they say I walk better, easier, etc. It is as much an addition to comfort in sitting, reclining, and walking, lifting, etc., as the limb itself.

Yours truly,
REV. C. H. DALRYMPLE.

ABOVE-KNEE AMPUTATION.
Fitted from Measurements.

GAGE COUNTY, NEB., Dec. 19, 1895.

A. A. MARKS:

DEAR SIR:—I am a farmer; have worn artificial limbs about sixteen years. I consider your artificial limbs superior to all others, as there are no ankle joints to wear out or clatter. The cost to keep your leg in order thus far has been comparatively nothing. Yours truly,

LANSING HINMAN.

ABOVE-KNEE AMPUTATION.

LANCASTER COUNTY, NEB., Dec. 19, 1895.

DEAR SIR:—Your limb has given me good service.

Respectfully,
JAMES HILL.

KNEE-BEARING AMPUTATION.

LINCOLN, NEB., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn artificial limbs for thirty-one years. During that time I have had three different kinds. The leg that you made for me is the boss; I have worn it now for nine years, and I like it better every day. The rubber foot cannot be excelled. I walk two or three miles every day, going to and from my office, with perfect ease. My limb is amputated below the knee, and I use a knee-bearing limb,

It fits me splendidly; I do not have to wear straps or suspenders to keep it on.

Respectfully yours,

W. W. ENGLISH.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

RED WILLOW COUNTY, NEB., Dec. 18, 1895.

A. A. MARKS:

DEAR SIR:—I am well pleased with the artificial limb I purchased of you. Have worn it for ten years. It is apparently as good as when I first put it on. My occupation is agent and operator for B. & M. R. R. Co. I get around quite well. None of the railroad men know that I am a cripple, only those that I have told.

Respectfully yours,

VALENTINE SELLS.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

DODGE COUNTY, NEB., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—My arm I purchased about eleven years ago has far surpassed my expectations.

My arm was amputated so close to my elbow that I have but very little control over the joint; notwithstanding I can make considerable use of the artificial arm, the fitting is so well and the joints work so nicely. I was somewhat doubtful as to getting a fit from taking the measure myself.

Results have shown that with ordinary care in measuring, following your instructions, one can be positively assured of a perfect fit. The rubber hand is something to be proud of; with gloves on both hands it is almost impossible for a stranger to distinguish the difference. The hook, knife, fork, and brush accompanying the arm are very convenient. With the hook and ring I can pitch almost as much hay as I ever could.

I handled lumber about two years in a lumber yard here, and never had a man in the yard that could handle a stick more in a day than I could.

Yours very respectfully,

A. W. FORBES.

NEVADA.

WASHOE COUNTY, NEV., Oct. 25, 1895.

A. A. MARKS:

DEAR SIR:—I have worn one of your rubber feet for about two years. It remedies the defects of the ankle-joint leg previously worn by me. I can now ride a bicycle with anyone. I am,

Yours truly,

F. B. PORTER.

BOTH ARMS AMPUTATED BELOW ELBOW.

Written with a rubber hand.

Nov 10th 1887

Mr Marks

Dear Sir I can cheerfully recommend your artificial hands I have found them very useful money could not buy them if I could not get another pair I can go out in company and no one ever thinks of me being a cripple my hands are so natural. I write this with my artificial hands and I am preparing to take a position as writer in the Registers of Deeds office I am a widow and have to earn my living It makes me shudder to think what my life would be if it were not for your artificial hands they are truly a great blessing to those who have had the misfortune to lose their hands I am well pleased with mine in every way wishing you success in your great work I am

Respectfully

Mrs Rosella Fox

No. 1217.

NEW HAMPSHIRE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CARROLL COUNTY, N. H., Dec. 19, 1895.

A. A. MARKS:

DEAR SIR:—I cannot see how you made such a good fit for me from measurements. The fit is so perfect the leg does not even feel strange to my stump. The leg enables me to walk so naturally my most intimate friends can hardly tell which is the artificial. Respectfully yours,

MRS. C. H. B. WHITTIER.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CHESHIRE COUNTY, N. H., Dec. 30, 1895.

A. A. MARKS:

GENTLEMEN:—In behalf of Mr. George H. Kimball of this city we desire to express our sincere thanks and hearty appreciation of the fine artificial limb received from you. For three months Kimball had been able to do nothing at all toward his own support, and had been just able to drag himself around on his old shattered apology for a limb with the help of two canes. The limb reached us at twelve and at two o'clock Mr. Kimball was around the street with only one cane, exhibiting his new acquisition. The next day, Saturday, he began work by sawing a cord of wood. He cannot now find words to express his gratitude to the friends who assisted him in procuring one of Marks' Nineteenth Century Triumphs.

Thanking you for promptness and perfect satisfaction, we remain,

Very respectfully,

BULLARD & SHEDD, Druggists.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I have worn one of your artificial limbs for more than four years. I am well satisfied with it and can recommend it to all.

I walk three-fourths of a mile to my work and go over the road four times a day.

Yours truly,

CHARLES W. WALLINGFORD.

Strafford County, N. H.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

SULLIVAN COUNTY, N. H., Mar. 11, 1896.

A. A. MARKS:

DEAR SIR:—I have worn the rubber foot you made for me nearly eleven years, and I am very much pleased with it. My foot was taken off about five inches above the ankle, and my weight is 240 pounds. I am a machinist by trade, and can stand on my leg at the vise or lathe all day with ease. I think the workmanship superior to any other make. I was surprised to have such a good fit by measure, as you never saw me; but you made the leg by measure just as well as it could be if I had been at your place.

Very respectfully yours,

F. A. WATRESS.

NEW JERSEY.

BOTH LEGS AMPUTATED BELOW THE KNEES.

MIDDLESEX COUNTY, N. J., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—After twelve years' constant use in wearing a pair of your artificial legs with rubber feet, I gladly bear testimony to their superior merits. I am able to work all day and then walk a mile in eighteen minutes. My work being block-cutting, I am on my feet very often. My prior experience with other kinds tell me of the difference between the comfort and the durability of each, and places your make far ahead of any other in every essential respect.

I remain,

Yours truly,

ELIJAH RHINE.

LEG AMPUTATED BELOW THE KNEE, AND ARM AMPUTATED ABOVE THE ELBOW.

SOMERSET COUNTY, N. J., Dec. 16, 1895.

In 1859 I suffered the amputation of my right leg and right arm. As soon as practicable thereafter I had Mr. Marks apply his artificial limbs to me. At that time he was manufacturing artificial legs with ankle joints. In 1863 I had one of his rubber feet applied. In 1865 I procured a new leg, and in 1871 I renewed the leg which I have worn ever since, during a period of twenty-five years. My experience with the old style of ankle joint and the rubber foot is of such a character as to compel me to speak in high praise of the rubber foot.

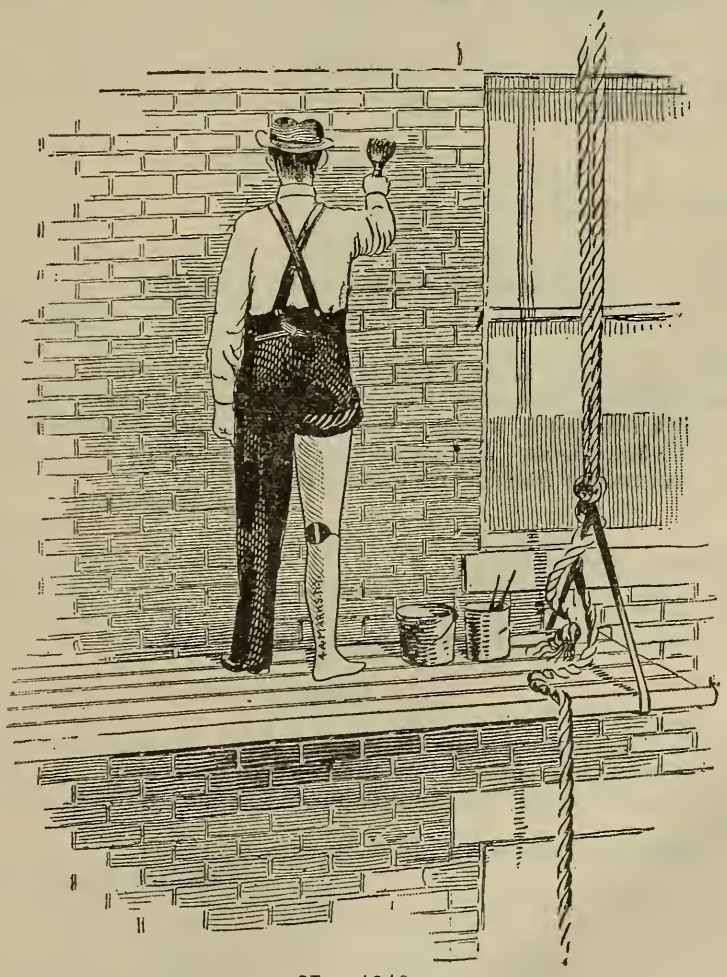
MORRIS FORCE.

ABOVE-KNEE AMPUTATION.

Dec. 16, 1895.

A. A. MARKS, ESQ.:

I am still wearing the leg you furnished fourteen years ago. I have worn it comfortably with less than six dollars cost for repairs. My occupation



No. 1218.

(house painter) gives it a good test. I can and do work on scaffolds, ladders—in fact anywhere. I have but a three-inch stump. I am well satisfied.

Yours truly,

ROBERT H. PERRY.

Hudson County, N. J.

ABOVE-KNEE AMPUTATION.

BERGEN COUNTY, N. J., Jan. 2, 1896.

A. A. MARKS, ESQ.:

DEAR SIR:—I take pleasure in testifying to the satisfaction I have derived from the use of your artificial limb. I have worn Mr. Marks' artificial leg now for nine years with entire satisfaction. I wish particularly to recommend the rubber foot. It makes walking more natural and easy on account of its elasticity than a wooden foot, and more confidence can be placed in it. In my opinion it cannot be too highly recommended. I am,

Yours, etc.,

ARTHUR CHRISTIE.

ABOVE-KNEE AMPUTATION.

TESTIMONIAL.

1st. Occupation since wearing your artificial leg: Insurance agent and collector of taxes; justice of the peace sixteen years; light ordinary work; cutting wood; gardening; gathering fruit, etc.

2d. How long worn? Since July, 1879.

3d. Point of amputation: Left leg; thigh; eight inches below hip.

4th. Comparative cost of repairs: No cost except for suspenders.

5th. Other information: Worn constantly with great comfort, because of its light weight and soft, flexible rubber foot. I can truthfully testify with pleasure as above.

Yours very truly,

JAMES HOFF.

Hunterdon County, N. J.

ABOVE-KNEE AMPUTATION.

Dec. 19, 1895.

MR. MARKS:

DEAR SIR:—In regard to limb I have of your make, words cannot express the satisfaction it has given me. I have worn it fourteen years constantly, and to-day can walk five miles, which is wonderful, I think, considering my limb is off above the knee-joint. I have had no repairs except for lengthening in that time. The rubber foot has no worthy rival.

Yours respectfully,

J. C. GREEN.

Morris County, N. J.

ABOVE-KNEE AMPUTATION.

UNION COUNTY, N. J., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I have worn your limb since 1867. I think the india-rubber foot is the greatest of inventions. It gives ease to the stump. No clicking in the ankle. I have a seven-inch stump above the knee; left leg. I walk eight miles a day.

My occupation is a farmer. I can walk without a cane.

CHARLES HENRY HOLMES.

ABOVE-KNEE AMPUTATION.

UNION COUNTY, N. J., Jan. 3, 1895.

MR. A. A. MARKS:

DEAR SIR:—The artificial leg is operating finely. I can walk with ease. It is next to impossible to detect any limp. I use a cane very little, for I can get along as well without it.

Yours very truly,

GEORGE S. EVERETT.

KNEE-BEARING AMPUTATION.

PASSAIC COUNTY, N. J., March, 1896.

MR. A. A. MARKS:

DEAR SIR:—I will say that I have worn your legs for the last thirty-three years, and in that time put them to the severest test. Having worked at my trade, that of a machinist, up to a few years back, I have taken my part in handling the heaviest machinery in all conceivable positions both in marine engine building, locomotive work, and in pedestrianism.

I have acted as a sewing machine agent in this and other cities, and would carry a machine on my back two and more flights of stairs and think nothing of it. The elastic rubber foot is one of the most charming features of your artificial limbs.

Respectfully yours,

JAMES RAWSON.

BELOW-KNEE AMPUTATION.

Dec. 23, 1895.

DEAR SIR:—Having worn your artificial limbs for over sixteen years, I would recommend them above all others for their strength and durability. I wore my first limb for over seven years, and in that time it has cost me just $1.50 for repairs.

Yours, etc.,

Elizabeth, N. J. JOHN J. KEILY.

BELOW-KNEE AMPUTATION.

HUDSON COUNTY, N. J., Dec. 16, 1895.

MR. A. A. MARKS:

SIR:—I am well pleased with the limb and willing to testify to its merits. My work is felling and hewing timber, which is very laborious. The point of amputation is about seven inches below the knee. The cost of repairs has been comparatively nothing.

Yours respectfully,

JONATHAN A. BAKER.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—Having had your style of artificial limbs in use for twenty-eight years I find, after all these years, that I would not under any circumstances use any other make. I find it durable, easy, soft, and comfortable to wear. I have to put your limb to a very severe test, and it stands it nobly and satisfactorily.

Yours,

Jersey City, N. J. WILLIAM WICK.

BELOW-KNEE AMPUTATION.

JERSEY CITY, N. J., Dec. 22, 1895.

MR. MARKS:

I can cheerfully say that I have had the use of patented artificial legs for fourteen years, next February 14, and I can say that your artificial leg has given me the highest satisfaction.

I lost my right leg about twenty-two years ago; it was amputated three or four inches above the ankle joint, and ever since I have had your artificial leg I have followed the kalsomining trade for more than thirteen years. I put my leg on every morning, and continue my daily trade, going up and down my ladder from morning until night, both winter and summer.

Yours truly,

J. B. COLE.

BELOW-KNEE AMPUTATION.

MONMOUTH COUNTY, N. J., Dec. 16, 1895.

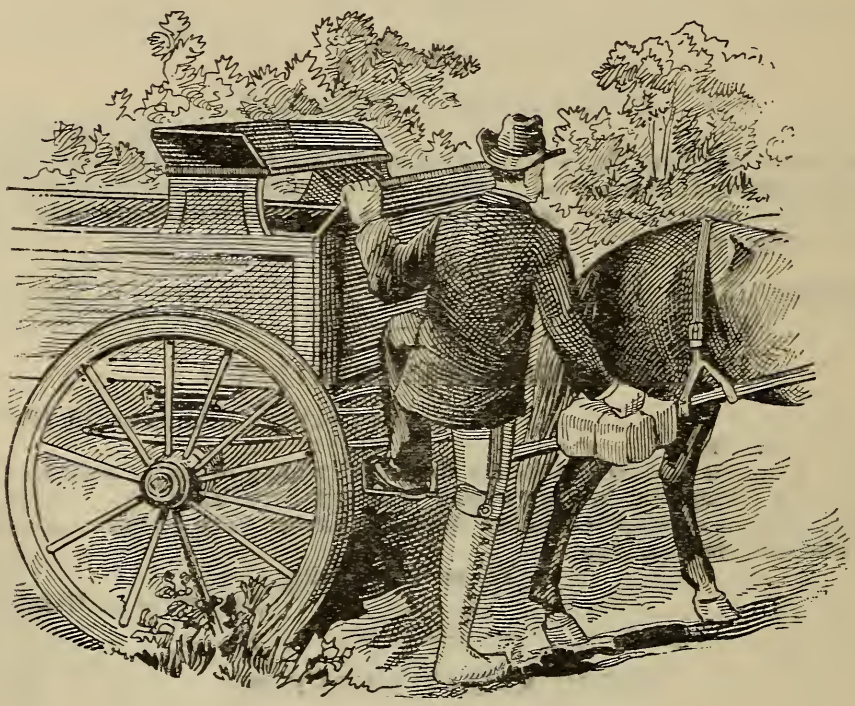
DEAR SIR:—I have been walking on one of your limbs ten years, and I like it very much, especially the rubber foot. It is the best, and I can walk all day without any pain. Yours, etc.,

D. C. WOOD.

MONMOUTH COUNTY, N. J., July 8, 1894.

A. A. MARKS:

SIR:—I would not wear any other leg but yours, as I think it is just the right kind to have. I am driving a wagon and have been for the past three



No. 1219.

seasons. I have to jump in and out about sixty times a day besides climbing up stairs. The leg does not bother me and I have to move pretty fast sometimes. GEO. A. BREWSTER.

BELOW-KNEE AMPUTATION.

SOMERSET COUNTY, N. J., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn one of your artificial legs for twenty-two years with very little repair. It has given me good satisfaction. Stump seven inches. I like the rubber foot very much. Yours,

J. A. VAN NEST.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WARREN COUNTY, N. J., Dec. 19, 1895.

MR. MARKS:

SIR:—I am highly delighted with your leg. I have used an artificial limb since 1865, and about eleven years ago I got your patent, and I have more

comfort than I ever had before. I can get around better, hunt the mountains, and feel at ease.

Yours with respect,

S. B. DANLEY.

ABOVE-ELBOW AMPUTATION.

JERSEY CITY, N. J., Dec. 16, 1895.

DEAR SIR:—It was my lot to meet with an accident by which it became necessary to have my left arm amputated two inches above the elbow. I have been wearing one of your artificial arms for nearly ten years. I am well pleased with it. My position is book-keeping, and it is of great service to me, and as an ornament it is next to nature itself.

Respectfully yours,

MARY W. RYAN.

BELOW-ELBOW AMPUTATION.

NEWARK, ESSEX CO., N. J., Dec. 18, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—On the second day of March, 1880, I lost my right hand in a mill, but with the artificial arm you made for me I am working at my trade as miller, and have not lost a day on account of the arm. Without the arm I would not be able to write these few lines to you.

Respectfully yours,

LOUIS LUEDDECKE.

APPARATUS.—NO. 784 LEG.

BURLINGTON COUNTY, N. J.

A. A. MARKS:

DEAR SIR:—Having used your apparatus for deformed foot constantly for the past eighteen years, I can cheerfully say that it has answered the purpose intended, by concealing my deformity and enabling me to walk in a natural manner and without tiring.

Yours respectfully,

Dec. 16, 1895. HENRY SASSAMAN.

PARTIAL FOOT AMPUTATION.

OCEAN GROVE, N. J., March 3, 1896.

MR. A. A. MARKS:

DEAR SIR:—I am a printer by occupation; my work is feeding and making up jobs on presses, lifting heavy newspaper forms, etc. Your new aluminum artificial limb constructed for me is a marvel, being light, neat, and strong. In fact, I cannot recommend it too highly.

Yours respectfully,

WM. D. NEWMAN.

SECTION OF HAND, No. 1048.

ESSEX COUNTY, N. J., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—While out gunning I shot my right hand off nearly to the wrist. I gave up in despair, thinking my work was done for life, I being a hatter and my work being done almost entirely with the right hand; but after getting one of your rubber hands find I can do my work as well as ever with no inconvenience whatever. I have had it repaired once at a trifling cost.

Yours truly,

GEO. GREY.

NEW MEXICO.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

BERNALILLO COUNTY, N. M., May 22, 1893.

MR. A. A. MARKS:

DEAR SIR:—I am well pleased with my artificial limb. I am getting along better than I expected, it fits me very well and hurts me nowhere.

I am,

Respectfully yours,

ROBERT PURDY.

NEW YORK.

BELOW THE KNEE AND BELOW THE ELBOW AMPUTATIONS.

COLUMBIA COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I wish to add my name to your long list of grateful patients. One of my arms is amputated below the elbow and one of my legs is amputated below the knee. I have worn the artificial leg and arm you made for me eleven years ago constantly, and have obtained great service from them. I am a very heavy man, weighing two hundred pounds, and am employed on the railroad. Respectfully yours,

HENRY E. LOWELL.

BOTH LEGS AMPUTATED BELOW THE KNEES.

TOMPKINS COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS, New York City:

DEAR SIR:—As far as the rubber feet are concerned, I shall say they are the best. They are to-day without an equal. I do hereby challenge any other maker in the world to produce a man that has a pair of artificial feet to walk with me. I do not take a back seat for any man that has got two good natural feet in a one-mile race. I will answer all communications sent to me by others in regard to the durability of the rubber feet.

Respectfully yours,

THOMAS CLEARY.

(See cut No. 728.)

(Extract taken from a local paper.)

WALKING WITHOUT FEET.

THE BEST RECORD BEATEN.—A fair-sized audience assembled at Ithaca Rink last night to witness the effort of Thomas Cleary to beat the best mile walking record made by a man with artificial feet. Cleary, it will be remembered, suffered the loss of both feet some two years ago.

At 9 P. M. "the man without feet" made his appearance upon the floor and began his task of endeavoring to beat the best record heretofore made.

Mr. Cleary without apparent effort began his walk, going quite moderately at first, but as he neared the conclusion of the mile he quickened his pace and passed the mile-post in fine style in 16 minutes and 50 seconds, thus beating the best record by 2 minutes and 20 seconds, and making 17 laps in 17.10.

BOTH LEGS AMPUTATED BELOW THE KNEES.

WESTCHESTER COUNTY, N. Y., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—Over twenty years ago I met with the misfortune of having both my legs crushed by the railroad cars, which necessitated amputation below the

knees. I was then a mere lad, and did not fully realize the gravity of my misfortune.

By the advice of my surgeons and others, I placed myself under your care for restoration. Your reputation as the one most competent in the land had so impressed me that, from the first, I felt that I was soon to realize the most that skill and ingenuity could possibly do for me. In this I have not

No. 1220.

been disappointed, for your labors have restored me to my feet, and I am, for all practical purposes, myself again. I well remember how proud I was when your genius placed me in a position in which I could indulge in youthful sports, how I availed myself of every advantage, playing ball, boating, fishing, and hunting in summer, and skating in winter. I even went so far as to swing my partner, on several occasions, in rural dances. I have always felt that your artificial legs were wonders, and ought to be known throughout the land.

My latest fad is that of riding a bicycle. I found the task difficult at first, but I succeeded, after repeated attempts, to ride well and to enjoy it.

Respectfully yours,

JAMES A. McDONALD.

BOTH LEGS AMPUTATED BELOW KNEE.

ALLEGANY COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS, ESQ.:

KIND SIR :—I believe the rubber foot is the only kind of foot fit for use, especially for a person that has lost both legs. I have tried several kinds and know whereof I speak. The last that you made for me is simply "out of sight" compared with others that I have worn.

Yours,

T. S. TEFFT.

ABOVE-KNEE AMPUTATION.

ALBANY COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have given my leg a thorough trial, having worn it for over eighteen years. I would not exchange it for any leg of other manufacture. The elasticity of the rubber foot is as natural as the real one, and the simple mode of construction makes the leg proof against getting out of order.

I have never felt the need of an ankle-joint. I can go up and down hill without the joint better than with it.

I can do almost all kinds of work with ease. My occupation is house carpenter, going up and down ladders, in fact doing all kinds of work, so that the durability of your patent has been fully tested by me.

I can cheerfully recommend your limbs to all.

Yours respectfully,

WM. SELKIRK.

ABOVE-KNEE AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been using your artificial leg for twenty-two years.

The rubber foot acts splendidly. I think it is as near perfection as anyone could wish for. My occupation, that of gate-keeper, requires me to be on my feet pretty much all the time. My leg was amputated about six inches below hip-joint, so I have but a very short stump to work on.

I remain, yours respectfully,

CORNELIUS MORRISSEY.

Brooklyn, N. Y.

ABOVE-KNEE AMPUTATION.

Dec. 17, 1895.

MR. MARKS:

DEAR SIR:—I have worn your artificial legs for about twenty-five years.

I have a thigh amputation, a five-inch stump. I have worn five other legs of different makes, and I would not accept of any other leg, if I had to wear them if they were given to me.

I am a carpenter and work at my trade.

Respectfully yours,

Brooklyn, N. Y. ABRAM D. CLARK.

ABOVE-KNEE AMPUTATION.

BROOKLYN, N. Y., Dec. 18, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—I have been wearing one of your limbs for nearly thirteen years, and am fully persuaded that they are the best made. At present I am in the lumber business, and find not the least trouble in getting over lumber and on to the highest piles we have in the yard. My leg is off above the knee, and I have considerable collecting to do and find no difficulty in walking any distance.

Yours truly,

F. T. NEWCOME.

ABOVE-KNEE AMPUTATION.

BROOME COUNTY, N. Y., Dec. 18, 1895.

DEAR SIR:—In the month of June, 1874, you made for me an artificial leg.

It is now fast approaching twenty-one years, and during that time its use has been severe, constant, and protracted. My occupation has been largely that of gardening. I have picked most of my apples, going into the tops of the trees on a ladder, and picking from fifty to seventy-five bushels every fall. I have worn artificial legs for forty-three years, and ought to know something about them.

Yours truly,

To A. A. MARKS, ESQ. H. W. PARKER.

ABOVE-KNEE AMPUTATION.

Dec. 19, 1895.

A. A. MARKS:

DEAR SIR:—I have been wearing one of your legs for over twenty-four years, and I would recommend them to anyone in need. As for comfort and natural walking, they cannot be excelled, and for durability they certainly cannot be equaled. I have had but two legs in nearly twenty-four years, and the one I am now wearing is good for four or five years yet, from all appearances. My limb is amputated four inches above the knee.

Respectfully,

Buffalo, N. Y. J. M. PALMATIER.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

CHENANGO COUNTY, N. Y., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn your artificial legs for about twenty-three years, and they have done me first-rate service.

They have all been fitted from measures. I have never been to your shop. My right leg was amputated at the thigh. I am a farmer and do all kinds of farm-work. I mow, cradle grain, hoe, etc., on one of your make of legs.

Respectfully yours,

WOODAL EASTMAN.

ABOVE-KNEE AMPUTATION.

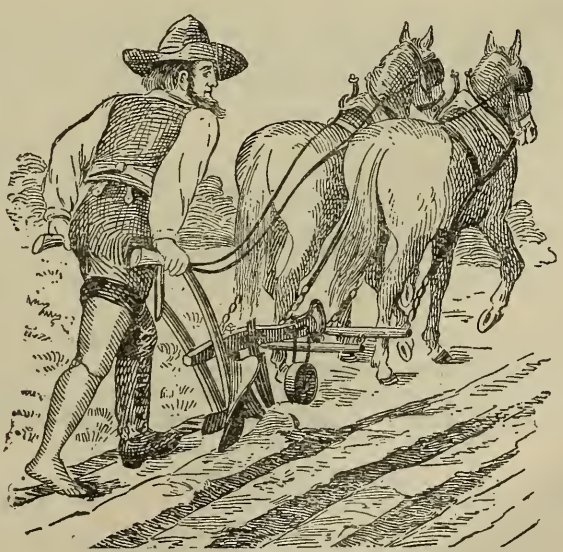
Fitted from Measurements.

CHENANGO COUNTY, N. Y., Dec. 29, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn one of your artificial legs for nearly thirteen years, and am exceedingly well pleased with it.

The rubber foot is a grand invention, no squeaking or getting out of order.



No. 1221.

It can be depended upon, and the knee-joint is the strongest and best I ever saw. I am farming and do all of my work, such as plowing, sowing, cradling, and everything that a farmer has to do.

Yours respectfully,

CHARLES E. WEBB.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

DELAWARE COUNTY, N. Y., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I believe your leg to be *the* best manufactured. My opinion is based upon my experience in wearing one of your full-length legs with rubber foot from about 1867 to the present time; previous to that time I had worn several other makes. The rubber foot is much more durable, inasmuch as it does away with the necessity of so many cords and bolts, and at the same time imparts a more natural and elastic step; it also sounds more natural when walking on the floor or pavement. My business heretofore has been farming and harness making. As good a fit as I ever had was made by you by measurements. My leg was taken off at the upper third, leaving a stump about 7½ inches in length from my body.

Yours, etc.,

J. A. CRAWFORD.

ABOVE-KNEE AMPUTATION.

Office of DR. H. PEARCE & Co., Druggists, Main Street,
PAWLING, DUTCHESS COUNTY, N. Y., Dec. 17, 1895.

DEAR SIR:—I have worn artificial legs for about twenty-eight years, and one of Marks' patent for about twenty-three years.

I regard yours far preferable to any other I have ever seen.

My amputation is above the knee.

Your leg is so simple and durable that there is no chance for anything to give out.

Respectfully yours,

HENRY PEARCE, M. D.

ABOVE-KNEE AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

I am working in the store from 5 A. M. to 9 P. M. every day. I do not know what I would do without my leg now. I have seen the limbs with wooden feet, but I prefer Marks' rubber foot. It has not got that click-clack sound so often heard from others.

WILLIAM A. KELLY.

New York City.

ABOVE-KNEE AMPUTATION.

March 4, 1896.

Mr. A. A. MARKS:

DEAR SIR:—I have worn the artificial leg you made for me for the past fourteen years. It has given me perfect satisfaction. It has cost me but little for repairs. I highly recommend it to anyone having use for same. As for me, I would wear no other. I am now employed on road and get around well.

Yours respectfully,

New York City. JOHN J. MURPHY.

BELOW-KNEE AMPUTATION.

NEW YORK, May 7, 1900.

MR. A. A. MARKS

DEAR SIR:—I will write you a few lines to let you know that the leg you made for me recently gives perfect satisfaction. I am delighted with it.

I have worn one of your artificial legs for the last ten years before getting the new one. I must say that you make the best artificial limbs, because they never cause any trouble. I can skate, dance, and no one notices that I am lame at all.

Yours respectfully,
ANNA BURMEISTER.

ABOVE-KNEE AMPUTATION.

Dec. 28, 1895.

A. A. MARKS:

DEAR SIR:—Having worn your limbs for over twenty years, and being well pleased with them, I would not do without the rubber foot. I never saw a limb that equaled yours. I always got a good fit from you. My limb is amputated nine inches from hip joint. My business is traveling on the road selling stationary. I am on my feet a good deal and do lots of walking. You have my thanks and best wishes.

Respectfully,
Norwich, N. Y. EDGAR S. KELLOGG.

ABOVE-KNEE AMPUTATION.

Dec. 30, 1895.

MR. A. A. MARKS:

DEAR SIR:—I got one of your legs with rubber foot about twenty-five years ago, and have worn it most of the time. The amount of repairs on it has been light. I have worked at farming pioneered on the Western frontier, and hunted in the North Woods. I seldom use a cane, and friends remark how well I get around with it. My occupation is wood-sorting, which requires constant standing. For comfort and durability it has no equal.

CHAS. McDOWELL.
Oneida County, N. Y.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

ORANGE COUNTY, N. Y., Dec. 19, 1895.

MR. A. A. MARKS:

I purchased of you eighteen years ago last February an artificial leg which has been in constant use ever since. My work is in a creamery and cheese factory. The work is very heavy, and I am on my leg at least twelve hours every day. My limb was amputated within six inches of my body. Before purchasing this limb of you, I had two of another manufacturer, which only lasted about four years each.

Very truly yours,
JOHN ROACH.

ABOVE-KNEE AMPUTATION.

QUEENS COUNTY, N. Y., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—In August, 1882, I lost my leg by an explosion in a drug store. Being young and my stump very short, I did not think that I could wear an artificial leg at all. In the spring of 1887 I received one of your full-length legs, which I now use and have been using every day since without any trouble. My occupation is a flagman and gateman, which requires me to walk across three railroads changing signals every three minutes for twelve hours every day.

Yours respectfully,
JOHN H. SCHAFER.

ABOVE-KNEE AMPUTATION.

ROCKLAND COUNTY, N. Y., Dec. 27, 1895.

I am very well satisfied with the artificial leg you made for me and take great pleasure in recommending it to others.

JEREMIAH HANGLON.

ABOVE-KNEE AMPUTATION.

Dec. 18, 1895.

MR. A. A. MARKS, New York:

DEAR SIR:—While a policeman in New York City August 26, 1874, I had the misfortune to have both of my legs broken while on duty at the French dock, foot of Morton Street. After being in the hospital nearly a year, I had to have my right leg amputated four inches above the knee. In the spring of 1876 I got of you a leg with a rubber foot. I think the leg and foot are the best made.

Yours very truly,

Suffolk County, N. Y. JASPER G. TERRY.

ABOVE-KNEE AMPUTATION.

SULLIVAN COUNTY, N. Y., Dec. 20, 1895.

I have for the past eleven years used one of A. A. Marks' artificial legs with rubber foot. The finish, fit, and durability of these legs are, I have no doubt, superior to any other make, so much so that the expense for repairs during that time has been nothing. The amputation is above the knee, and although my work is rather laborious, so perfect is the fit and so suited the leg that I have had very little trouble.

D. M. SCRIBER.

ABOVE-KNEE AMPUTATION.

WESTCHESTER COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I had the misfortune to lose my right leg when I was six years old. At the age of eight I tried my first artificial limb. My profession compels me to be on my feet the greater part of the time. I feel no fatigue whatever. I can say this, that having once used the Marks artificial limb I feel that I can never get along without one.

Yours respectfully,

WM. B. DAVIS, M. D.

ABOVE-KNEE AMPUTATION.

WYOMING COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS, New York City:

I have worn your make of artificial leg for little more than nine years past, and I cannot speak too highly of the rubber foot. Although my work is not laborious I walk a great deal. I would recommend your make in preference to any other. Very respectfully,

MRS. J. W. DEREVERE.

KNEE-BEARING AMPUTATION.

MADISON COUNTY, N. Y., Dec. 16, 1895.

MR A. A. MARKS:

DEAR SIR:—I have worn an artificial limb of your make for about twenty-three years. Previously I had worn one of a different manufacture, but I did not like it. Since wearing your make I have walked more easily and with no noise.

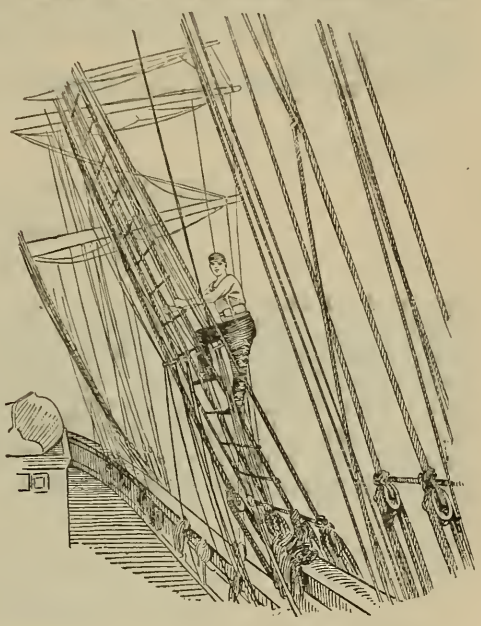
Very truly yours,

REV. I. N. CLEMENTS.

BROOKLYN, Oct. 10, 1900.

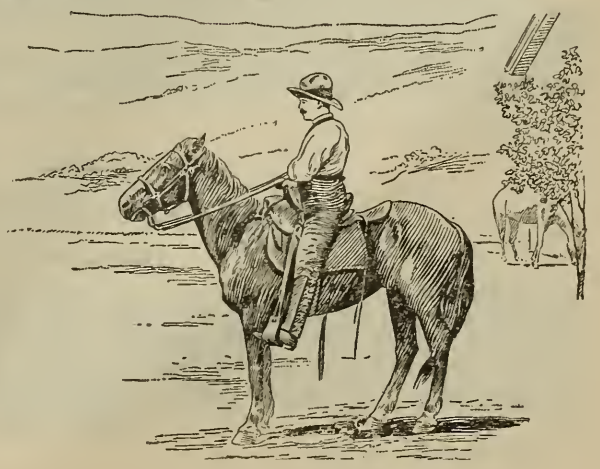
A. A. MARKS:

DEAR SIR:—In October, 1897, I met with a railroad accident that deprived me of both of my limbs. My right leg was amputated a few inches below the knee and my left in the knee joint. In two months after the amputation I ordered of you a pair of artificial legs. You fitted me neatly, and in a very short time I was able to get about and mingle among my friends, go to my club, and engage in business. I am part owner of the bark *Obed Baxter*, and as I am very fond of the sea, I occasionally take long cruises, and have but recently returned from a cruise covering two years, which carried me around the world. I am sending you a picture of myself at the wheel, a position I frequently occupy. I also send you a picture of myself in the shrouds, taken off the coast of Japan, although I do not make a



practice of going aloft, I have done so on a number of occasions and have found very little difficulty on account of my artificial legs. I also send you a photograph of myself on horseback while in the Hawaiian Islands near the city of Honolulu.

The artificial limbs of your manufacture are marvels. They are light, simple in construction, and thoroughly efficient. I have not had occasion to send my limbs for repairs since they were made, and from all appearances it will be a long time before any repairs will be required.



If this letter pleases you, you can publish it among your testimonials when occasion arises.

Respectfully yours,

W. E. EDGERLY.

BELOW-KNEE AMPUTATION.

CHEMUNG COUNTY, N. Y., Dec. 14, 1894.

MR. A. A. MARKS:

DEAR SIR:—I desire to say in the fewest words possible that, after wearing three different legs, I am prepared to certify that for ease, comfort, and durability your legs with rubber feet are, and of right ought to be placed at the head of the list.

I have worn your leg over seventeen years.

THEO. G. SMITH, Deputy.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CHEMUNG COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I find your limb to be superior to the legs of other makers that I have used before. It is safe to stand or walk on. It does not produce the creaking and rattling noise which greatly annoyed me in the others. It is easily kept clean and in good working order. I am on my feet every day. My business is harness-making, and I cannot see but that my leg is as good now as it was when I commenced wearing it. I particularly recommend your success in fitting from measurements.

Respectfully,

GEO. W. HARVEY.

BELOW-KNEE AMPUTATION.

COLUMBIA COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am a farmer, which has always been my principal business. For the past thirty-three years or more I have worn the rubber foot constantly. The elasticity of the rubber foot no doubt added much to its durability, and at the same time gave a more natural movement in walking, obviating the disagreeable thumping that attended the other foot I had used, and at the same time the jar to the natural limb, making it more comfortable and easy.

I am, yours most truly,

H. R. HOSFORD.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

COLUMBIA COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing limbs of your make for some twenty-four years, and have worn the old style with ankle joint. I can say that yours with rubber feet are far the best in all respects.

The one that I now wear you made from measurements. It was a good fit, and is as good to-day as when I first put it on. I am a harness-maker.

Respectfully yours,

C. H. GROVES.

BELOW-KNEE AMPUTATION.

DUTCHESS COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I am more than pleased with my leg. I have worn your celebrated leg with rubber foot for the last seventeen years.

I have had severe trials; my leg could stand them, and I am certain that I can appreciate it as the best artificial leg ever patented.

Yours truly,

HIRBEN H. OSTRANDER.

BELOW-KNEE AMPUTATION.

DUTCHESS COUNTY, N. Y., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have used four of your legs, and find them satisfactory in every respect.

I want no ankle joints. The rubber foot is the best improvement yet. As for repairs, it has not cost me over $3 for all.

I am standing all day at my work. I have used patent artificial legs since 1864, and yours gives the best satisfaction of any.

Yours truly,

RUFUS TILBE.

BELOW-KNEE AMPUTATION.

FRANKLIN COUNTY, N. Y., Dec. 14, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—I have worn an artificial leg for the past thirty years. During the first fifteen years I tried various makes, but was always annoyed after wearing one but a short time by the joints in the foot becoming loose, and "rattling," or "clicking" at every step. Your rubber foot is entirely noiseless, and does away with the above very serious objections.

The elasticity of the rubber fully takes the place of joints in the foot and ankle. But more than anything else I value your make because of its perfect fit and stability. While standing on a moving wagon, car, or ferryboat, there is none of that "waving," or "see-sawing" motion so common and noticeable in wearers of all other makes. I weigh 175 pounds, and for four years was salesman in a dry goods store, and on my feet from twelve to fifteen hours a day.

Yours very sincerely,

ISAAC M. WARREN.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

MADISON COUNTY, N. Y., Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—My wife has worn the artificial leg we bought of you since receiving it (the 1st of November, 1887) with perfect satisfaction. It works well and no signs of wear. We are well pleased, and wish you every success.

Respectfully yours,

K. E. CARDNER.

BELOW-KNEE AMPUTATION.

NEW YORK CITY, Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I have worn an artificial limb for the last twenty-three years, and for the last twelve years have been wearing one of yours with rubber foot.

With my experience I consider your artificial limb with rubber foot far superior to any I have used, and recommend it to my patients. I can walk much better than I ever could before. Expenses for repairs are almost nothing.

Yours, etc.,

DR. G. W. NELSON.

BELOW-KNEE AMPUTATION.

NEW YORK, Sept. 10, 1900.

A. A. MARKS, ESQ.:

DEAR SIR:—In looking over some old receipts to-day, I came across one from your firm, dated September 20, 1893—just seven years ago—for an artificial leg. How time flies! It does not seem so long. Yet in that time I have worn the leg daily with comfort and ease, and so far it has not cost me one cent for repairs. I heartily indorse your artificial limbs, and take pleasure in recommending them to anyone in need.

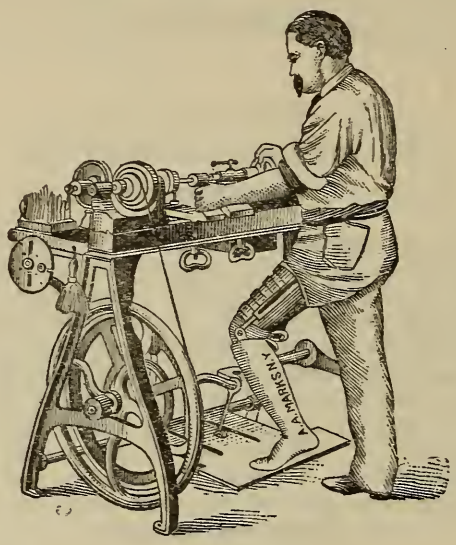
E. L. CRAWFORD.

BELOW-KNEE AMPUTATION.

NEW YORK CITY, Jan. 2, 1895.

A. A. MARKS:

I lost my leg below the knee from gunshot wound received in the late war. As soon as my stump healed, the United States Government presented me with one of ——'s legs with an ankle joint. I wore it for a short time, and thought



No. 1222.

I liked it, but when I had one of your rubber feet applied to it I at once discovered that I had bettered my condition. I have worn your rubber foot now about twenty-eight years, am a machinist, and work at the lathe and forge. For ten years I worked on a foot lathe, doing the treading with my rubber foot.

WILLIAM DIETZE.

BELOW-KNEE AMPUTATION.

Dec. 17, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—I have been wearing your make of legs for twenty-eight years. My stump is one inch below the knee. I have marched in a parade in this city from Fifty-ninth Street to the Battery, and return. Phil. Kearney Post, to which I belong, in this city, can vouch for the above.

I remain, yours truly,

A. HAUSBECK.

New York City.

BELOW-KNEE AMPUTATION.

NEW YORK CITY, Dec. 16, 1895.

A. A. MARKS, ESQ:

DEAR SIR:—I am pleased to report that with your patent rubber-foot leg I have been especially pleased. I am not only able to attend to my business, but can indulge in a good long walk occasionally, and enjoy myself in other respects. I can walk better and further on your legs than on any of the old styles I have worn, the action of the foot being natural and noiseless, sufficiently so to deceive the closest observers.

Respectfully yours,

J. J. EGAN.

BELOW-KNEE AMPUTATION.

NEW YORK CITY, Jan. 1, 1896.

MR. A. A. MARKS:

DEAR SIR:—Have worn your patent artificial legs for nearly fourteen years, and will make application for a new one from the Government just as soon as the time comes. I have only about three inches below the knee. I am on my leg twelve hours every day.

Yours truly,

JOHN J. WILSON.

BELOW-KNEE AMPUTATION.

NEW YORK CITY, Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—After an experience of over twenty-two years in the use of your patent artificial leg with rubber foot, I desire to say that it has given me first-rate satisfaction. About eighteen years ago I was induced to purchase a leg of Mr. ——'s make, with his wooden foot and ankle joint. After using it for nearly two years with constant repairs, I abandoned it, and am now using yours again. That trial was enough for me; I want no more ankle-jointed wooden feet for me on an artificial leg, so long as yours are to be had, as my own experience proves their superiority.

CHAS. LIBENAU, M. D.

BELOW-KNEE AMPUTATION.

NEW YORK CITY, Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing one of your artificial legs with patent rubber foot (amputated below the knee) twenty-eight years. I can say from observation and inquiry with those who are wearing artificial legs, and I know many, that the one I wear (your patent) is in every respect superior, more durable, less liable to get out of order, than any artificial leg I have seen or have any knowledge of.

Truly yours,

SAM'L TRUESDELL,
Pension Agent, New York Agency.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

NIAGARA COUNTY, N. Y., Dec. 26, 1895.

MR. A. A. MARKS, New York:

DEAR SIR:—The leg you furnished me, from measurements sent you, fitted perfectly and has given me the best of satisfaction.

Yours truly,

PATRICK CLARK.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

ONEIDA COUNTY, N. Y., Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—Having used others with ankle motion, I am able to judge the difference and advantages of your patent rubber foot. There is no rattling or breaking down. I have given yours nearly twenty-eight years' trial, and in so doing have proved the real merits and great satisfaction it has given me. I

have done all kinds of heavy shop work on it with comparatively no difficulty, with amputation five inches below the knee. My leg was fitted from measurements. I can work on the roof of a building with ease.

Yours respectfully,

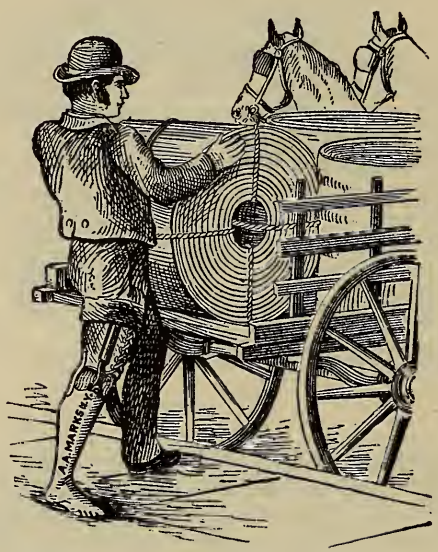
D. M. GREEN.

BELOW-KNEE AMPUTATION.

NEW YORK CITY, Jan. 28, 1888.

A. A. MARKS:

DEAR SIR:—I have worn one of your rubber limbs for about fifteen years with entire satisfaction. My occupation is truckman for the New York Belt-



No. 1223.

ing and Packing Company. I help in loading my own truck and frequently lift bales of several hundredweight.

The limb has been in constant use.

Respectfully yours,

C. H. BREWSTER.

BELOW-KNEE AMPUTATION.

ONONDAGA COUNTY, N. Y., Dec. 16, 1895.

A A. MARKS:

DEAR SIR:—I have worn your legs nearly twenty-eight years and have worked at nearly all kinds of work. I think they are the best.

Respectfully yours,

N. REYNOLDS.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have used one of your patent limbs for ten years, and have found it perfectly satisfactory,

Yours truly,

JOHN M. MILSPAUGH.

Orange County, N. Y.

BELOW-KNEE AMPUTATION.

ORANGE COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—On April 9, 1865, I lost my right leg at Sumterville, S. C., and have used artificial legs for thirty years.

I have seen about all the different kinds of legs made, and must say that I consider yours the best. My amputation is two and one-quarter inches below the knee, and my business requires me to be on my feet from 5 A. M. to 10 P. M. daily.

Very respectfully,

JOSEPH LOMAS.

BELOW-KNEE AMPUTATION.

Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have used one of your artificial legs fourteen years, and the second one you fitted me with I have used three years. After using other artificial legs with ankle joint, I am convinced that your patent leg with rubber foot is the best artificial limb manufactured in this or any other country. Point of amputation, six inches below the knee. Occupation, harness-maker.

Yours truly,

ABRAHAM EVANS.

Orange County, N. Y.

BELOW-KNEE AMPUTATION.

PUTNAM COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—The leg you made for me in 1872 has been in every-day use from that time till now, and is a good leg yet.

The expense for repairs has been less than a dollar per year.

Yours, etc.,

W. PEPPER.

BELOW-KNEE AMPUTATION.

RENSSELAER COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—I have worn the limb that you made for me in 1863 every day up to November 6, 1895, or about thirty years.

It did not cost me to keep in repair during all that time twenty-five dollars, and while I weighed only about 140 pounds when I first commenced wearing it, my weight increased to over 220 pounds. My new leg of 1893 gives the same satisfaction. My business has been laborious and active.

MICHAEL VAUGHN.

BELOW-KNEE AMPUTATION.

RICHMOND COUNTY, N. Y., Dec. 16, 1895.

SIR:—I have used the Marks leg for thirty-four years.

It cannot be excelled; I have used one continuously for ten years without having any repairing. Your legs have given me the greatest satisfaction; as for durability they have no equal.

There is no foot in my opinion that can compare with the rubber foot.

Respectfully yours,

JOHN S. BOWNE.

BELOW-KNEE AMPUTATION.

ROCKLAND COUNTY, N. Y., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—Having used one of your patent artificial legs with rubber foot some twenty years, I consider that a fair trial. I am a farmer, and have had little or no expense attending the use of the leg. I cheerfully recommend your work.

Truly yours,

C. R. MERTINE.

BELOW-KNEE AMPUTATION.

SCHENECTADY COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—The artificial leg that you made for me seven years ago has proved perfectly satisfactory, and far exceeds anything I ever anticipated in taking the place of the limb I lost about eight years ago while on duty, as brakesman for the New York Central & Hudson River R. R.

Yours,

CHAS. WING.

BELOW-KNEE AMPUTATION.

SCHUYLER COUNTY, N. Y., Dec. 19, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn the leg you made for me for about eleven years, and I think it is good for a year or so longer. I have never worn any other and have no desire to, as I believe your rubber foot is easier to walk on, more durable, and much more natural than any other kind. I go up and down stairs the same as people with natural feet, I ride a bicycle, skate on ice and roller skates, and I can run so that I make some people hustle to keep up with me. I had my leg fitted from measurements, and it works like a charm. My leg is off about four inches below the knee; the cost for repairs has been too slight to mention. I now own the best livery in front of the Northern Central R. R. station here.

Yours respectfully,

EDWARD BERTHOLF.

BELOW-KNEE AMPUTATION.

July 8, 1896.

A. A. MARKS:

DEAR SIR:—My experience in wearing your leg is such that I cannot say too much in its praise. In 1872 I first got my artificial leg from you. For the first twelve long years I wore that leg every day; the first four years I built bridges, graded streets, and dug sewers in the city of Utica. The next three years I kept a hotel. The next five years I boated on the Erie Canal.

During the twelve years it did not cost me a dollar for repairs, but at the end of that time it was nearly worn out. I repaired it myself. Finally I replaced it by a new one.

Respectfully yours,

JOHN MCCUE.

Seneca County, N. Y.

BELOW-KNEE AMPUTATION.

ST. LAWRENCE COUNTY, N. Y., Dec. 19, 1895.

MR. A. A. MARKS:

DEAR SIR:—I feel as though I ought to thank you for the success you have had in fitting me with an artificial limb. I believe no other limb that I have seen could take the place of the rubber foot. I have worn an artificial limb for the past thirty years.

I am a laborer and often lift heavy articles, such as barrels of sugar and all kinds of freight. I would advise all who are so unfortunate as to be obliged to wear an artificial limb to try your rubber foot. I remain,

Yours very respectfully,

A. H. ARMSTRONG.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

STEUBEN COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS, ESQ. :

DEAR SIR :—The leg you fitted by measurements for me is fine. I am a cabinet maker by occupation. I have used artificial legs thirty years. I have had three of Marks', one of ——, and like yours much the best. Leg off eight inches below the knee. I have worn your leg twenty-six years at a cost of less than one dollar and fifty cents a year. I like your leg well enough to buy when this gives out.

Yours very truly,

P. P. LAIRD.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

A. A. MARKS, ESQ., New York :

DEAR SIR : I have been wearing one of your artificial legs, with rubber foot, for the past ten years, and now have my second leg. I use no cane or other assistance in walking, and can walk a mile in fifteen minutes. I frequently go trout-fishing, and walk ten miles. I am perfectly at home on roller skates, and in fact can perform any work I ever could before amputation.

I have known persons three years who never knew I wore an artificial limb, and would not believe it until they saw it, as there is nothing in my walk to indicate my misfortune.

Yours truly,

IRA W. SCHAFFER,
Pumping Engineer.

Steuben County, N. Y.

BELOW-KNEE AMPUTATION.

SUFFOLK COUNTY, N. Y., Dec. 16, 1895.

For the last twenty years I have used one of A. A. Marks' artificial limbs with rubber foot with satisfactory results.

No rattling hinges or squeaking joints to annoy me, I can recommend your leg to all who contemplate getting a limb.

Yours,

GEO. W. KINNER.

BELOW-KNEE AMPUTATION.

TIOGA COUNTY, N. Y., Dec. 25, 1895.

MR. MARKS :

SIR :—I have worn one of your artificial limbs with rubber foot for ten years, and found it one of the greatest blessings this world affords. I have done the work of six in the family, and taken care of the milk and butter of nine cows this summer. I have not been to any expense for my foot since I got it. My leg was amputated about one inch and a half above the ankle joint.

Yours respectfully,

MRS. G. M. SMITH.

BELOW-KNEE AMPUTATION.

ULSTER COUNTY, N. Y., Dec. 17, 1895.

A. A. MARKS:

DEAR SIR:—My wife had her limb amputated in Roosevelt Hospital in New York City, July 15, 1882.

One year afterward she commenced wearing one of your limbs, and is wearing it now with ease, doing all her housework, up and down stairs. Limb was amputated below the knee joint. I am

Respectfully yours,

MARTIN R. NILAN.

On the evening of June 7, 1888, Johnny Carey stole into the yards of the railroad depot at Utica, N. Y., with an arm full of papers. It was his intention to board an express train which was about due. The train was late. Johnny sat upon the platform step and fell asleep. When the express came it ran over his leg and mangled it in a frightful manner. Johnnie's first thought was that the yardmaster had got hold of him and that he had better get out of the way. In his efforts to get up he was brought to realize the fact that he had been run over. The depot men picked him up and took him to a neighboring

No. 1224.

hospital, where the surgeons amputated the mangled leg. Johnny made a quick recovery and soon got about on crutches. A few sympathizing friends contributed enough money to buy one of Marks' artificial legs. Johnny soon learned to walk, and resumed his newspaper traffic. Ever since then he has been going about so naturally and comfortably that nobody suspects that he is the same Johnny Carey who met with the frightful accident in 1888; he is able to run, walk, jump on and off cars just as well as other boys, and he manages to sell as many papers as any of his fellow-newsboys.

BELOW-KNEE AMPUTATION.

Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn one of your artificial legs thirteen years. I am yardmaster of the Ulster and Delaware Road, and on the go from twelve to fourteen hours every day, and have not lost a day since I got your leg. . . My leg is amputated about four inches above the ankle. I was perfectly fitted from measurements, and I have not had any trouble with the stump since I have worn this leg. I remain,

Yours truly,

Ulster County, N. Y. JOHN LOUNSBERRY.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been using one of your artificial limbs for more than a decade, and find it answers *fully* to everything you claim, durability, neatness, etc. I am on my feet the most of my time, and walk a great deal, and find no inconvenience.

My leg is amputated about five inches below the knee. The cost for repairs is very small. It is a grand success. I remain,

Truly yours,

HUGH DICK.

Ulster County, N. Y.

BELOW-KNEE AMPUTATION.

ULSTER COUNTY, N. Y., Dec. 17, 1895.

DEAR SIR:—My occupation is harness maker. I have worn your artificial leg almost twenty-four years. I am satisfied that for endurance your patent artificial leg cannot be beat.

Yours truly,

AUGUST GROSCH, JR.

BELOW-KNEE AMPUTATION.

WESTCHESTER COUNTY, N. Y., Dec. 16, 1895.

MR. MARKS:

DEAR SIR:—I work at most everything that gives your leg a hard trial, such as working on a thirty-foot ladder at painting in the warmest of weather. Last winter I drove a wagon and was out all kinds of weather, but it still holds well. My limb is off six inches below the knee. I remain,

Respectfully yours,

JOSEPH PUGMIRE.

PARTIAL FOOT AMPUTATION.

BROOKLYN, N. Y., Dec. 18, 1895.

A. A. MARKS:

DEAR SIR:—I have worn some sort of an appliance for a Chopart's amputation for upward of twenty-seven years, and of course I know something about such things, and I will say that before I secured one of your appliances, I could never get one that would not break every little while. The fault always lay in the effort to work in the ankle-joint motion which is of no consequence with your rubber foot—certainly for more than twelve years I have had no use for the ankle-joint motion while wearing your rubber foot.

Your rubber foot attached to the wood socket seemed to me to be the height of perfection, but your rubber foot attached to the aluminium socket is a vast improvement, because it has reduced the size of the foot about the ankle so much. The socket fits the shin like a glove to the hand. This result I found because I have a very tender shin bone.

Very truly yours,

W. P. EDDY.

ANKLE-JOINT AMPUTATION.

40 PACIFIC ST., BROOKLYN, N. Y., Dec. 19, 1895.

MR. A. A. MARKS:

I have worn the rubber-foot leg you made for me twenty-two years. It has given me perfect satisfaction. I heartily recommend it. I lost my foot in the U. S. Navy.

JAMES CONNELL.

ANKLE-JOINT AMPUTATION.

DUTCHESS COUNTY, N. Y., Dec. 31, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn your leg constantly for ten years.

I walk with safety and comfort, and no repairs needed; yet I do a great deal of walking.

I remain, very truly yours,

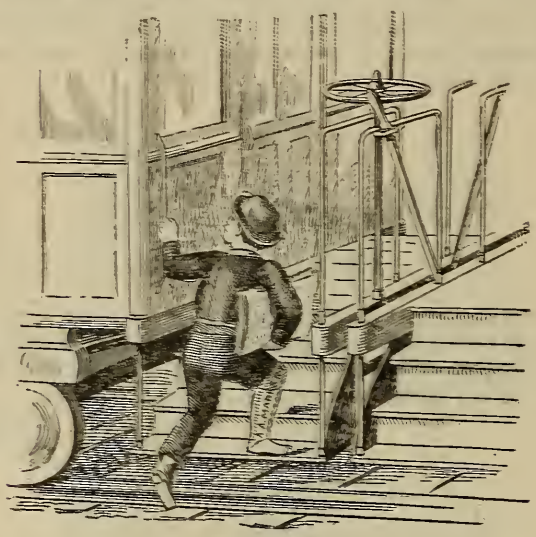
JULIA EMERY.

ANKLE-JOINT AMPUTATION.

WESTCHESTER COUNTY, N. Y., March 22, 1896.

MR. A. A. MARKS:

DEAR SIR:—I sell morning papers on the R. R. trains, get on and off while the train is in motion, and wear one of your rubber feet; very few of my



No. 1225.

friends know of the fact, and those who do regard me as the possessor of a remarkable foot. I experience no inconvenience; I heartily recommend your leg as the best made.

JOHN SCHARFF.

ANKLE-JOINT AMPUTATION.

March 3, 1896.

MR. MARKS:

DEAR SIR:—My foot was amputated at the ankle joint, called the Syme's amputation. I have worn several different kinds of artificial limbs since 1868, but prefer yours to any I have had. I would not wear a foot with an ankle joint if it were given to me. I have worn yours and worked with it every day for seventeen years in the Delamater Iron Works, foot of West 13th St., New York City, and found it perfect in every respect.

Yours respectfully,

F. W. FUNCH.

New York City.

ANKLE-JOINT AMPUTATION.

MR. MARKS:

DEAR SIR:—I am a farmer; in March, '86, I cut one of my feet so badly with an ax that amputation was necessary. On March 29 a Syme's amputa-

tion was performed. In August following I purchased one of your artificial limbs, and must say it gives me entire satisfaction. I am able to do almost all kinds of farmwork, and walk a mile very comfortable. Indeed many strangers are surprised when they find that I am wearing an artificial limb.

Very respectfully,

THEO. O. HULSE.

Suffolk County, N. Y., Dec. 16, 1895.

INSTEP AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS, New York:

DEAR SIR:—Previous to buying my foot from you I visited all the principal makers in New York, but found nothing I liked so well as the foot I saw at your place. I am now employed as salesman, and do a great deal of walking and standing. I get along almost as well as ever I did, without any limp or halt whatever, and a person not knowing the fact would never suspect there was anything wrong.

I am, yours truly,

New York City. ROBERT LOEB.

ANKLE-JOINT AMPUTATION.

MOUNT VERNON, N. Y., Dec. 26, 1895.

A. A. MARKS.

DEAR SIR: The aluminum artificial leg you recently made for me is all that it could possibly be. It is a strong, light, neat, and efficient limb, and I wish to express my great pleasure and heartfelt thanks.

Very respectfully,

WILLIAM MARSHALL.

ANKLE-JOINT AMPUTATION.

NEW YORK, Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I congratulate you on your latest award. My foot I got of you some time ago is giving entire satisfaction and gets lots of hard wear daily.

A. F. TODD.

ANKLE-JOINT AMPUTATION.

BROOKLYN, N. Y., Dec. 20, 1895.

MESSRS. A. A. MARKS:

DEAR SIR:—I am very well satisfied with the aluminum leg. My occupation is in a carpenter shop doing a little of everything as a helper, where I sometimes have to carry considerable lumber on my shoulder, and I find no difficulty in walking.

I remain, yours truly,

JAMES DUNDEN.

BELOW-ELBOW AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—The artificial arm you made me about eight years ago is giving complete satisfaction; I would not know how to do without it. I find it very useful in my work.

Yours respectfully,

Chemung County, N. Y. H. A. LEESE.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

CHEMUNG COUNTY, N. Y., Dec. 12, 1895.

A. A. MARKS, ESQ.:

DEAR SIR :—I take great pleasure in testifying to the merits of your artificial limbs. I am wearing one of your rubber hands, and from my experience and in comparing it with others, I heartily recommend its superiority.

I have worn it every day for nearly twelve years, and with the expense of a few dollars upon the suspenders have kept it in such good repair that many have been surprised upon learning that I have an artificial limb. My arm was amputated just above the wrist.

Yours very respectfully,

EUGENE ATKINS.

BELOW-ELBOW AMPUTATION.

COLUMBIA COUNTY, N. Y., Jan. 11, 1896.

MR. A. A. MARKS :

DEAR SIR :—I respectfully state that I am now using, and have used for the last twelve years, one of your patent artificial arms with rubber hand. I have never worn any other. I would not do without mine by any means.

Yours respectfully,

WM. B. HOLSAPPLE.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

DELAWARE COUNTY, N. Y., Dec. 23, 1895.

MR. MARKS :

DEAR SIR :—The artificial arm you made for me seven or eight years ago gives perfect satisfaction. I am a farmer and do most all kinds of work with it and its attachments. Yours respectfully,

J. A. HENDRY.

BELOW-ELBOW AMPUTATION.

NEW YORK CITY, Dec. 16, 1895.

MR. A. A. MARKS :

DEAR SIR :—I well know that Edward Wiley, who is now absent, is satisfied with his hand; he is able to drive a team of horses, and do other farm work.

Yours obediently,

SAMUEL RAPP, M. D.

BELOW-ELBOW AMPUTATION.

NEW YORK CITY, Dec. 16, 1895.

A. A. MARKS :

I have worn one of your artificial arms with rubber hand for fifteen years, and found it very satisfactory in every respect.

Until a short time since I was manager of a large branch telegraph office, and I found the arm a great help to me in my duties.

I put a pencil in the rubber hand, between the fingers, and used it to time the message, while sending with the other hand.

Yours very truly,

L. LESLIE LATHROP.

BELOW-ELBOW AMPUTATION.

ONTARIO COUNTY, N. Y., Dec. 19, 1895.

A. A. MARKS, ESQ.:

DEAR SIR :—I take pleasure in testifying to the satisfaction I have derived from the use of your artificial arm, my arm being amputated two inches above

the wrist joint. I have worn the arm you made for me nearly thirteen years, with perfect ease from the first day. I have worked for the N. C. R. Co. as freight inspector and car sealer ever since I purchased my arm. I could not do my work without the hand. I believe your rubber hand and arm to be the most perfect and most durable of any I have ever seen. I am more than pleased with it, and money could not buy it could I not get another.

I remain, respectfully yours,

J. E. CARR.

BELOW-ELBOW AMPUTATION.

Fitted by Measurements.

OSWEGO COUNTY, N. Y., Dec. 23, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing the artificial arm you made for me now for ten years, and am very much pleased with it. Your rubber hand is very convenient. I do not know how I would get along without it. I can farm the same as ever.

The hook arrangement is just the thing for the farmer.

Respectfully yours,

IRVING R. WILLIAMS.

BELOW-ELBOW AMPUTATION.

SCHOHARIE COUNTY, N. Y., Dec. 16, 1895.

MR A. A. MARKS:

DEAR SIR:—I am well pleased with my artificial arm I bought of you thirteen years ago. I use the nickel-plated hook to great advantage. I am a farmer, and can do nearly all kinds of work.

Respectfully,

MATTHIAS TERRELL.

BELOW-ELBOW AMPUTATION.

SULLIVAN COUNTY, N. Y., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am very much pleased with my arm. It is so light, convenient, and is worth thousands of dollars to me.

The new attachment that you have made is so comfortable that I can keep it on day and night. I keep a general country store, and do all the work myself. I remain, yours very respectfully,

N. KURZ, JR.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

WYOMING COUNTY, N. Y., Dec. 16, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—Am pleased to say the arm I bought of you six months ago has proved satisfactory in all you claim for it. I am now able to fill regular desk in freight office, doing all kinds of work requiring use of both hands.

My arm was amputated just below the elbow, and before purchasing your arm I was unable to get anything to do better than night watchman.

Yours truly,

BRUCE M. WALKER.

WRIST AMPUTATION.

BROOKLYN, N. Y., Dec. 17, 1895.

MR. MARKS:

DEAR SIR:—After using your rubber hand for the past nine years I take great pleasure in stating that it is far superior to what you claim. I am more

than satisfied and would cheerfully recommend your hand to anyone who has been unfortunate enough to have lost one.

Respectfully, etc.,

JOHN B. BRADSHAW,
Engineer Str. Gov. Hill.

WRIST AMPUTATION.

Dec. 18, 1895.

DEAR SIR:—My occupation is a sawyer. I lost my hand at the wrist on April 12, 1882, by sawing timber. Two months after I got one of your artificial arms, which I found very valuable.

Respectfully,

LEONARD RYERSON.

Brooklyn, N. Y.

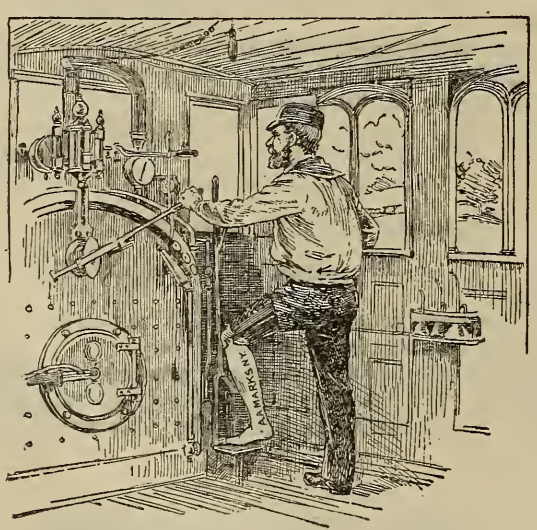
NORTH CAROLINA.

BELOW-KNEE AMPUTATION.

December 7, 1891.

To MR. A. A. MARKS, 701 Broadway, New York:

My leg is working O. K. I have worn it every day since I put it on last



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April. I am runnning a locomotive every day. Would not have any other; am often asked by my friends which of my legs is off.

Yours most respectfully,

W. J. ANGIER.

Craven County, N. C.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

SWAIN COUNTY, N. C., Dec. 17, 1895.

A. A. MARKS:

DEAR SIR:—I have been wearing one of your legs since 1882. I am a miner by occupation, and have been rushing over the mountains of North Carolina. My leg was made by self-measurement.

W. S. THOMAS,

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

ROWAN COUNTY, N. C., July 30, 1896.

MR. A. A. MARKS;

DEAR SIR:—I take pleasure in stating that the arm you made me goes far beyond my expectations. I am a farmer, forty-five years old; I have worn one of your arms nine years without any cost for repairs, and it is in good order yet.

Yours, etc,

S. A. KENERLY.

NORTH DAKOTA.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

WALSH COUNTY, N. DAK., Oct. 12, 1893.

MR. A. A. MARKS:

DEAR SIR:—Your limbs are the best I have ever seen; they are far ahead of the slip-socket limbs which are made in Minneapolis. I am so well satisfied with what I have that I will purchase a new limb from you soon.

Yours truly,

HENRY FRANKLIN.

OHIO.

BOTH LEGS AMPUTATED, ONE IN THE KNEE JOINT AND THE OTHER BELOW THE KNEE.

PUTNAM COUNTY, O., Dec. 17, 1895.

MR. A. A. MARKS, New York City, N. Y.:

DEAR SIR:—On the 12th of April, 1875, I had the misfortune to lose both my feet in a railroad accident. To-day I am fully convinced of the wisdom of my choice, in selecting you as my limb-maker, for I am walking far better than I or any of my friends thought I would ever do.

Since one of my limbs was amputated at the knee joint, and the other an inch and one-half below, it was the general belief of myself and my friends that I could not handle myself well enough to walk with any degree of safety or satisfaction.

I now walk wherever I want to go, and am filling a responsible position in a railroad office.

You have already been informed that I am a member of the Knights of Pythias, and frequently parade on foot with my lodge; this is a proof that I am well able to take my part in the battle of life. My weight is now two hundred pounds, but with this excessive weight I have little or no trouble in walking, even in extreme hot weather. I have lately become a member of the Accident Insurance Company, whose general agent assured me that they had nothing to fear from my inability to take care of myself.

I remain, very truly yours,

(Illustrated on pages 126–127). A. A. WEAVER.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing your artificial legs for the last twenty-five years. I have been working on a farm most of the time; I can plow and do

all kinds of work. I am well pleased with the rubber foot. I can walk over rough ground with ease. I am working from sunrise to sunset most every day.

My leg was made by measurements and it fits me perfectly. The expense of keeping the leg in repair is very small, considering how rough I have used it.

Yours truly,

D. W. PRITCHARD.

Delaware County, O., Dec. 21, 1895.

ABOVE-KNEE AMPUTATION.

MUSKINGUM COUNTY, O., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn artificial legs for thirty years, and think I ought to be a pretty good judge of them by this time. After wearing your artificial leg with patent rubber foot attached for over twenty years, it gives me great pleasure to recommend them to any person or persons wanting anything of this kind.

Yours truly,

SILAS W. FICKEL.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

PORTAGE COUNTY, O., Dec. 16, 1895.

MR. A. A. MARKS, New York City:

DEAR SIR:—The artificial leg which I received of you in October, 1885, with rubber foot is giving me perfect satisfaction in every respect. I have worn four different makes of legs inside of thirty years, with ankle joints, and can truly say that I would not have a new leg with the ankle joint as a gift, since I have been wearing your rubber foot. My occupation is a barber. Around town I hardly use a cane, except in winter time.

Respectfully your friend,

E. E. ROSE.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

TRUMBULL COUNTY, O., Dec. 19, 1895.

TO MR. A. A. MARKS:

MY DEAR SIR:—My opinion is based on actual observation and by comparisons with legs of different patterns in walking over rough and icy surfaces as well as on the smooth floor. The Marks leg is by far the safest and easiest managed.

I am a farmer fifty-eight years old.

Yours very truly,

FRANK A. CLISBY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

ASHTABULA COUNTY, O., Dec. 17, 1895.

A. A. MARKS, ESQ., New York City:

SIR:—My left leg was amputated below the knee, and your substitute has been worn, to my great convenience and safety. I feel grateful that you have been so fortunate as to produce so exceedingly valuable and satisfactory a limb.

My occupation is painting, necessarily standing a great deal, ascending ladders, climbing buildings, etc.

The limb has never failed to be all I required in my business.

I am, respectfully, your obt. servant,

WILLIAM H. LEROUX.

ABOVE-KNEE AMPUTATION.

Dec. 17, 1895.

A. A. MARKS, New York:

DEAR SIR:—I have been wearing the leg for nearly ten years, and can say that it gives *perfect satisfaction.* I had worn the wooden foot for eight years previous to this one of your make, and it is a great relief to be able to walk on the street without attracting the attention of everyone you meet.

J. V. MERWIN.

Cleveland, O.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

RICHLAND COUNTY, O., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn three limbs made in Philadelphia, but received scarcely any benefit from their use; but when I got you to make one for me in June, 1880, I found I had hit the mark. I am still wearing your make, and to all appearance will continue to do so. My limb is amputated four inches below the knee.

I am tilling the soil on a small scale, and am on my feet from morning until night, and feel no inconvenience from the use of your limb. The measurements I sent you secured a good fit, which shows that you can make as good a fit as if I had come to you, and you had taken the measure yourself.

WM. C. CRESWELL.

BELOW-KNEE AMPUTATION.

SENECA COUNTY, O., March 3, 1896.

A. A. MARKS:

DEAR SIR:—The rubber foot you made me eleven years ago is perfectly satisfactory. Yours truly,

H. B. LAWRENCE.

BELOW-KNEE AMPUTATION.

CLEVELAND, O., Nov. 5, 1887.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—For the past twenty-six years I have used your limbs as a substitute. Have found the same to answer the purpose about as nearly as art can approach nature. It has proved safe, reliable, and durable in all kinds of service, and under all circumstances, and with the exception of substituting a new socket once, when the old one had become too small, total cash for repairs has not equaled $1 per year.

As I weigh about 190 pounds, and see considerable of active life, my impression is that I have done the square thing by it, so far as testing its qualities is concerned. Yours truly,

JNO. G. JAMES.

BELOW-KNEE AMPUTATION.

Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing artificial legs for the period of nearly thirty years, the first fourteen of which I wore legs manufactured at Indianapolis, Ind. The next five years I wore out one of Dr. ——'s artificial legs made in N. Y. City, and the ten last years I have been wearing your artificial leg with the rubber foot. It gives good satisfaction. I think that the rubber foot is the best artificial foot that is made.

Yours truly,

Van Wert County, O. J. W. HUNTZINGER.

BELOW-KNEE AMPUTATION.

Dec. 23, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn your artificial leg for ten years, and I find it to be a good substitute for my natural leg.

I can most emphatically say that it is the best I can get, and far superior to any I have ever seen for comfort and durability.

Yours respectfully,

Vinton County, O. C. H. HAYES.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WILLIAMS COUNTY, O., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I have been wearing your make of artificial limbs since 1868. Previous to that I had worn one of another make. I consider yours much the better. Its points of superiority are chiefly in the doing away with the loose togel joints found in ankle and toe. Your rubber foot does away with the necessity for these joints, and gives the step a certainty of action that no other leg has. It also gives a springy, light step that is impossible in a wooden foot. Your knee joint irons are much better than those of the other leg I wore. I have had three of your legs, and one was fitted from measurements furnished by myself, and the others direct to person. The one made from measurements was as good as the others. My point of amputation is two and one-half inches below the knee.

I am yours truly,

SIMEON GILLIS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WOOD COUNTY, O., Dec. 17, 1895.

A. A. MARKS, New York:

DEAR SIR:—My leg was taken off seven inches below the knee. I got an artificial one with rubber foot nine years ago last winter; since then I have done the same work as I did before, and that is farmwork. I am twenty-six years old now, and can lift as much as anybody, and walk eight or ten miles without any trouble. Last winter I used the leg very hard while driving teams and hauling timber.

Yours, etc.,

FRANKLIN L. ROUSE.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

Mahoning County, O., Dec. 17, 1895.

Mr. A. A. Marks:

Dear Sir:—I have worn one of your artificial arms for twenty-eight years. About sixteen years ago I changed the hand, which was somewhat worn, for a rubber one, simply sending measurements, as I did in the first place for the arm, and both arm and second hand were perfect fits. The rubber hand seems to be just as good, after sixteen years of use, as it was at first.

My arm, the right one, is amputated midway between the wrist and elbow. During nearly thirty years that I have worn your artificial arm it has not cost me a cent for repairs, except the change of hand.

Rev. Geo. Bosley.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

Dec. 16, 1895.

Mr. A. A. Marks:

Dear Sir:—I ordered an artificial hand from you some ten years back, and have been wearing it every day since. I have never spent a cent for repairs in the ten years I have been wearing it. I work at A. E. T. Works, laboring, and can do as much work as any of the men with two hands who work in the same room with me. My hand was amputated at the wrist joint, and your arm could not have fitted better if I had been right there and had it measured.

Yours respectfully,

Muskingum County, O. Clarence Uphold.

BELOW-ELBOW AMPUTATION.

Muskingum County, O., Dec. 6, 1895.

A. A. Marks:

Dear Sir:—I have given my artificial hand a fair trial and I am more than pleased with it. I think there could be nothing better made. I feel that I can never say enough in way of praise of my hand.

Very truly yours,

Myrtle R. Hayes-Butler.

OKLAHOMA TERRITORY.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

Kingfisher County, Okla., Nov. 30, 1895.

Mr. A. A. Marks:

Dear Sir:—I have worn one of your artificial legs for six years, and it has given perfect satisfaction. I would not go without it for any money, I seldom if ever use a cane, and when I do I generally go off and forget it.

Yours truly,

J. W. Grin.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WOODWARD COUNTY, OKLA., March 10, 1896.

MR. A. A. MARKS:

DEAR SIR:—I have used artificial legs for over twenty-nine years, and I think I ought to be a good judge. I can walk easier with your leg and rubber

No. 1227.

foot attachment than with any other leg I have ever tried, and I have tried four different kinds.

I am a plasterer by trade, and work with your leg on the scaffold every day now. It fits me better than any leg I have ever tried, and it was made from measurements.

Very truly yours,

JAMES DIMMICK.

OREGON.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

ASTORIA, ORE., March 9, 1893.

A. A. MARKS:

DEAR SIR:—I have the pleasure to inform you that I am well satisfied with the leg you made for me; it is the best leg I ever wore, and gives me the best satisfaction. I can walk with it splendidly. I am,

Yours truly,

L. I. JOHNSON.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

MARION COUNTY, ORE., June 20, 1894.

A. A. MARKS:

MOST ESTEEMED SIR:—I have been for a long time desirous of writing you and expressing my continued satisfaction with the artificial leg you made for

No. 1228.

me, and now avail myself of the opportunity. It is five months since I obtained it. I walk very much and without a cane or support. I suffer no pain or uneasiness from it. My artificial leg is my best friend; without it my life would be miserable. (Occupation, sawmill and logging.)

W. R. SWINK.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

PORTLAND, ORE., Oct. 14, 1895.

A. A. MARKS:

DEAR SIR:—Your leg is a gem, the best I ever had; it is a perfect fit, and the only one that I ever had that I could put on and wear with ease. It fits me just like a nice fitting shoe. I remain,

Yours truly,

R. W. POOL.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

DOUGLAS COUNTY, ORE., July 13, 1896.

MR. A. A. MARKS:

DEAR SIR:—I received the artificial arm you sent to me in perfect order, and have been well pleased with it. I put it on the same day that I received it, and have worn it every day since. I could not do without it at all. I do all my own work, washing, ironing, patching, darning, almost all my sewing. We have three children, the oldest three years old last May, the youngest eight months old, and I have taken care of them myself.

Very gratefully,

MRS. THOMAS NICHOLSON.

PENNSYLVANIA.

BOTH LEGS AMPUTATED ABOVE THE KNEES.

YORK COUNTY, PA., Dec. 15, 1895.

A. A. MARKS:

DEAR SIR:—After sixteen years' use of the pair of artificial limbs you made for me with the rubber feet, I must truly say that I think you make the best artificial limbs. I wear them every day, and have not lost one day from the time I got them on account of their getting out of order. My work is not hard on limbs, but I am on my feet the most of the time. As my case is a bad one, I think I am doing very well.

Yours very respectfully,

ROBERT S. LOVEGROVE.

BOTH LEGS AMPUTATED BELOW THE KNEES.

LEHIGH COUNTY, PA., Jan. 6, 1896.

MR. A. A. MARKS:

I will inform you that my brother-in-law George Miller is getting along very well. He is working now ten years for the Philadelphia and Reading Railroad Co., as a watchman on a street-crossing at Macungie. He feels very proud with his legs, and is proud of them.

ALLEN CHRISTMAN.

BOTH LEGS AMPUTATED BELOW KNEES.

LUZERNE COUNTY, PA., Dec. 1895.

MR. MARKS:

DEAR SIR:—I am wearing two of your patent artificial legs for the last twelve years. Only once have I had them repaired, with very little expenses, and I think I can use them for some time yet.

J. SENGHAAS.

BOTH LEGS AMPUTATED BELOW THE KNEES.

PHILADELPHIA COUNTY, PA., Dec. 15, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—I am very glad to testify to the comfort and durability of your artificial limbs. Mine have been worn since July, 1882, and, being perfectly adjusted, they have enabled me to walk easily and naturally.

The ladies and gentlemen residing here have examined and commended your work. The Forest Home estate is extensive, and I walk with the same ease the country roads or streets of Philadelphia.

Yours,

HENRY LAURENS BASCOMB.

BOTH LEGS AMPUTATED BELOW KNEES.

Fitted from Measurements.

ELK COUNTY, PA., March 22, 1900.

MR. MARKS:

DEAR SIR:—I am well pleased with the pair of artificial legs that you made for me. They fitted me perfectly. I put them on the same day that I received them, and started to walk on them with two canes. Very soon after I found that I could dispense with one cane. I can walk up and down the steps when I please. I hope that you will succeed in serving others as well as you have me.

Respectfully yours,
AUGUST P. MODENBACH.

BOTH FEET AMPUTATED, ONE CHOPART'S AND THE OTHER BELOW THE KNEE.

COLUMBIA COUNTY, PA., Dec. 28, 1895.

MR. A. A. MARKS:

DEAR SIR:—I take pleasure in testifying to the satisfaction I have derived from the use of your artificial limbs.

I believe your rubber feet are easier to walk upon, more durable, and much more natural than any other kind. I was eleven years of age when I had my leg and foot taken off, and it was a year and fourteen weeks before I could go on crutches, and I wore a peg leg about thirteen years. I have worn your rubber feet ever since and would not be without them.

I remain, yours respectfully,
GEORGE UNBEWUST.

ABOVE-KNEE AMPUTATION.

Aug. 3, 1896.

A. A. MARKS:

Have been wearing artificial limbs forty-six years. I wore out six in twenty-two years, costing me from twenty-five to forty-five dollars a year to keep them in running order. Did not enjoy the rattling of them. Have been wearing a Marks leg twenty-four years; expense one dollar a year, and all comforts a veteran could wish for. My limb is in as good running order now as when I first commenced to wear it. I expect it to last many years.

JAMES T. SAMPLE, Mexican Veteran.

Allegheny County, Pa.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

BLAIR COUNTY, PA., Dec. 4, 1895.

MR. A. A. MARKS:

DEAR SIR:—I received one of your patent artificial legs with rubber foot fitted from measurement some ten years ago, and from that time to the present writing I have worn it every day.

I am a farmer, living in the country, and have rough roads to travel, but I can walk five miles a day. Yours truly,

MILES LEWIS.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

ERIE COUNTY, PA., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I am a telegraph operator, and live two miles from the office. I walk that distance every night and morning. I have worn one of your arti-

ficial limbs for over ten years, and I can cheerfully say that I think it has *no* equal.

My limb was made from *self-measurements* and is a *perfect fit*.

It is just as good to-day as it ever was; in fact, there is nothing that I can see to wear out. My limb was amputated about six inches from the body.

Very respectfully yours,

FRANK A. PORTER.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

DAUPHIN COUNTY, PA., Dec. 11, 1895.

A. A. MARKS:

DEAR SIR:—I have a stump ten inches long. I have worn a leg seventeen years. I have walked as far as twenty miles in one day, and did not mind it as much as one of the men with me, for he had to go to bed, and he had two good legs.

I am a janitor of a school building now. The building has twelve rooms, and I fire six furnaces.

Respectfully yours,

J. F. SOURBEER.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

DAUPHIN COUNTY, PA, Dec. 18, 1895.

DEAR SIR:—The artificial leg I received from you in 1886 when at Lititz has satisfied me fully. I had little confidence in artificial legs, as my stump had been out of use for four years and had become weak and stiff. I never use a cane, and travel long distances. In regard to the rubber foot, I am so attached to it I would not consent to wear any other; its movements are all I can ask for. Respectfully,

WM. F. DUNCAN.

ABOVE-KNEE AMPUTATION.

NORTHAMPTON COUNTY, PA., Jan. 15, 1896.

A. A. MARKS:

DEAR SIR:—Almost ten years have passed by and still I am contented with your leg. No noise, no breakdowns, no discomforts of any kind: all is quiet, durable, and satisfactory. Sincerely yours,

ERWIN P. MILLER.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

WYOMING COUNTY, PA., Aug. 13, 1895.

MR. A. A. MARKS:

DEAR SIR:—The artificial leg I received from you in 1893 has been in use since I received it. I am doing all kinds of work, and find the leg reliable in every respect. Although I am working in a telegraph office at the present time, I am general freight and baggage clerk for the Lehigh Valley R. R. This work requires me to be on my feet a good share of the day. I handle freight of all kinds and weights, often have to pick up a heavy valise in each hand, and carry them quite a distance. I do not use any cane at all.

My stump is only five inches from the body. Most persons wonder how I get along so well, indeed hardly anyone would think that I had a leg off at all.

Yours truly,

S. L. GARDNER.

KNEE-JOINT AMPUTATION.

Dec. 16, 1895.

DEAR SIR :—I have been wearing your make of artificial limb with rubber foot for about seventeen years, and I must say that I consider them the best that are made for durability, elegance, fit, and movements. I can do all my work as well as though I had my own natural limb.

MRS. ELLA E. MILLER.

Philadelphia, Pa.

BELOW-KNEE AMPUTATION.

BERKS COUNTY, PA., Dec. 19, 1895.

A. A. MARKS, New York City :

DEAR SIR :—I have the greatest pleasure in addressing you these few lines, in order to express the satisfaction I have with the artificial leg you manufactured for me. To the comfort and stability of your artificial leg I owe the invaluable treasure of walking almost naturally. I never use a cane. My occupation is laborious. I have used your make of legs since 1866. I have used this one sixteen years, and it has proved most satisfactory, never having required any repairs. I claim to be capable of judging of its merits.

I remain, your obedient servant,

G. W. REIDER.

BELOW-KNEE AMPUTATION.

CARBON COUNTY, PA., Dec. 16, 1895.

A. A. MARKS, New York City :

DEAR SIR :—My artificial limb is all that can be expected. Indeed a great deal more than I had a right to expect. My friends all say that anyone not knowing me could not tell that I am wearing an artificial leg.

Very truly yours,

A. W. RAUDENBUSH.

BELOW-KNEE AMPUTATION.

CARBON COUNTY, PA., Dec. 16, 1895.

MR. A. A. MARKS :

DEAR SIR :—I am more than pleased with the leg I purchased of you. I can get along very well—so well in fact strangers will not believe me when I tell them I have an artificial leg. I am a member of the brass band of our place, and can travel with any of them. My occupation is a laborer in the car-shops of this place.

Yours sincerely,

WM. C. NUSS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CRAWFORD COUNTY, PA., Dec. 20, 1895.

A. A. MARKS :

DEAR SIR :—My leg is entirely satisfactory.

My occupation is running a planing mill, which is laborious and heavy on the limbs and feet, handling lumber most of the time.

My weight is over two hundred pounds. The rubber foot prevents any jar and makes the tread light and elastic.

Yours respectfully,

W. W. WHITE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have used your artificial limb for thirteen years, and find it gives perfect satisfaction in every respect. My right leg was amputated about four inches below the knee. When I received the limb I was agreeably surprised at the perfect fitting by self-measurement. I am a shoemaker by trade.

FRANK P. NEWMYER.

Fayette County, Pa.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

FAYETTE COUNTY, PA., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—Am now wearing the second artificial leg manufactured by you. I take pleasure in bearing testimony to merit, etc.

Yours truly,

T. ROBB. DEYARMON.

BELOW-KNEE AMPUTATION.

Dec. 16, 1895.

To A. A. MARKS, New York:

DEAR SIR:—For a long time I have been wanting to write to you and let you know the perfect satisfaction your artificial leg has given me. I am able to skate, run, dance, and, what gives me the most satisfaction, I am able to ride a bicycle; not only ride it, but have been able to keep up with very good riders, and have ridden fifty miles at a time.

J. A. FRANTZ.

Lebanon County, Pa.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

LACKAWANNA COUNTY, PA., Dec. 24, 1895.

MR. A. A. MARKS:

DEAR SIR:—In 1866 I bought one of your artificial legs with rubber foot, and wore it for fourteen years without one dollar for repairs. In 1880 I ordered another one of your legs, and have worn it continuously ever since without one dollar expense.

By occupation I am a barber, and have worked at the chair for the last eighteen years. Yours truly,

G. H. WHITE.

BELOW-KNEE AMPUTATION.

LACKAWANNA COUNTY, PA., Dec. 16, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—On September 30, 1876, I lost my left leg. At that time I weighed 182 pounds. After getting well my weight increased to 208 pounds. I thought then that I was too heavy to wear an artificial limb, until I came across a gentleman who was a much heavier man than myself, who had worn one of your artificial legs with rubber foot for over ten years. This being a very good recommend from an entire stranger, I came to the conclusion that I would have one made also.

I got one in 1881, and have now worn it fourteen years.

I would further state that I am well pleased with it.

JOHN H. WILSON.

BELOW-KNEE AMPUTATION.

LACKAWANNA COUNTY, PA., Dec. 19, 1895.

MR. A. A. MARKS:

DEAR SIR:—Having for the past twenty-eight years been your customer I desire to add my testimony. I wore one of your feet every day for fourteen years, with but one dollar's expense for repairs. None but those who know of my having lost a limb will believe that I wear a patent leg, so naturally and easily do I walk. I never use a cane, and make no rattling noise when I walk on the sidewalk.

I worked for six weeks in a furniture manufactory with twenty men ten hours a day, and not one of them knew I had lost a limb until I told them. I am a cabinet maker and undertaker by trade. I am on my feet all the time.

J. W. MERSHON.

BELOW-KNEE AMPUTATION.

LUZERNE COUNTY, PA., Dec. 16, 1895.

MR. A. A. MARKS, New York:

DEAR SIR:—I have been wearing one of your legs for fifteen years, and in that time have never lost a day's work.

My occupation is shipping clerk for a sash and door factory. It is a three-story building, and my business calls me up and down the stairs a great many times a day. I can go up or down a pair of stairs as fast as anyone that has both legs. In my estimation there is no limb made in the wide world that will give the wearer the satisfaction that yours will. I have tried some other makes with the joints in the ankle, but they are useless to me.

Yours truly,

G. E. CARPENTER.

BELOW-KNEE AMPUTATION.

Dec. 17, 1895.

A. A. MARKS:

DEAR SIR:—I lost my left leg eight inches below the knee in the late war. In 1870 I procured one of your limbs with a rubber foot, which I wore with ease and comfort for five years. In 1875 I received the second limb with the rubber foot.

I walk so perfectly that anyone who is not acquainted with my misfortune cannot detect that I am a wearer of an artificial limb. I am a tinner, and for the last eighteen years I have been engaged constantly in putting on tin and iron roofs, and will defy any man with good sound limbs to beat me climbing a ladder or getting over the roof of a building, regardless of pitch. Having worn your limbs constantly since 1870, I know whereof I speak when I say that your limbs with the rubber feet are the best.

I remain, yours truly,

Mercer County, Pa. E. F. BENNETT.

BELOW-KNEE AMPUTATION.

MIFFLIN COUNTY, PA., Dec. 16, 1895.

A. A. MARKS:

DEAR SIR:—I take much pleasure in stating that the artificial leg I bought of you nine years ago has given entire satisfaction.

Yours respectfully,

F. J. ZERBE.

BELOW-KNEE AMPUTATION.

NORTHAMPTON COUNTY, PA., Dec. 16, 1895.

DEAR SIR:—I have worn your artificial leg nine years and I have had full satisfaction. I can say for truth that the rubber foot cannot be excelled in the

world. I can say for a perfect fit, and ease and comfort in wearing, it is the greatest invention I know of. I have a half a mile to go to work. I weigh all the stuff the company buys and sells, so I am all the time on my feet, and I can walk as good as ever I did.

I remain, yours truly,

MICHAEL FOX.

BELOW-KNEE AMPUTATION.

NORTHAMPTON COUNTY, PA., Jan. 8, 1896.

I have worn an artificial leg with rubber foot for thirty-one consecutive years. The repairs during that time have been slight.

I have been thoroughly satisfied with the action of the leg and cheerfully recommend it to all.

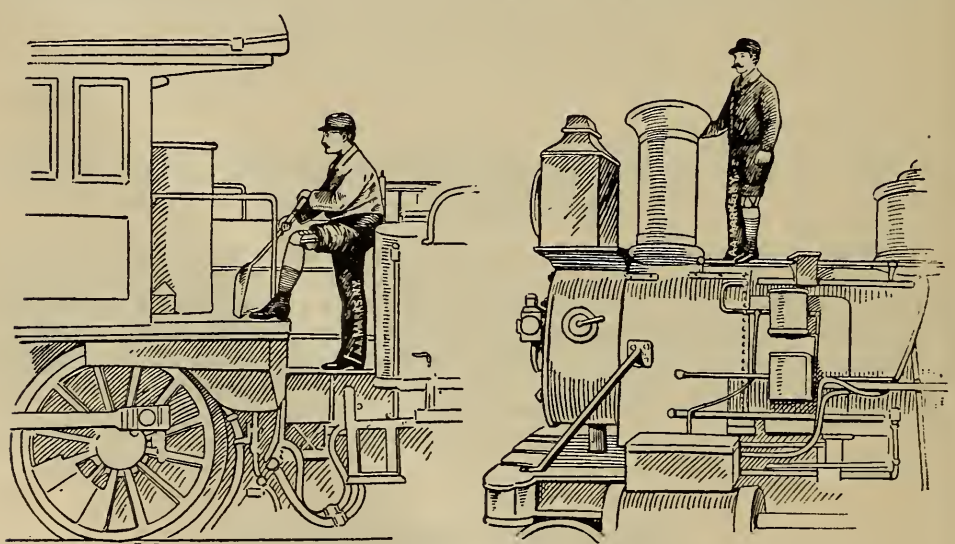
JOHN H. MEBUS.

BELOW-KNEE AMPUTATION.

February 1, 1900.

A. A. MARKS:

DEAR SIR:—I wish you to know how many days the leg you made for me worked during the year 1899. You see that it exceeds more working days of ten hours each than there are working days in the year. If you know of anybody, with an artificial leg, who has turned out more days' work than I have firing a big coal engine, remembering that I have to walk two miles to work and two miles from work, making four miles every day in addition to my work, let me know who he is, that I may compare time with him. During the month of January I worked 407 hours; February, 292; March, 358; April, 325; May, 280; June, 316; July, 337; August, 376; September, 337; October,



391; November, 375; December, 337. . . . If you will add up the number of hours, you will find it amounts to 4131, or more than 410 days for the year, and you know there are 313 working days in the year, so I have worked a year and ninety-six days in the year 1899, wearing your artificial leg every hour of that time, and it has not cost me one cent for repairs. It is as good now as it ever was. The engine that I am firing is one of those big ones that haul coal from the mines to Pottsville, No. 148. I enclose a photograph of my engine, where you will see me at my post of duty. I get all over her with the same ease that I ever did. Sometimes I climb on top of the boiler while in motion. I can tell you more about what I am doing with my leg if you want it. The hard use I am giving your leg and the excellent wear it is giving prove it to be the best in the world.

I am, respectfully yours,

FRANK FAUST, Pottsville, Pa.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

SCHUYLKILL COUNTY, PA., Dec. 16, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—The leg I purchased of you twelve years ago is giving me entire satisfaction. It is almost as good to-day as when I bought it.

It has not cost me one dollar for repairs, although it has been subjected to a very severe test. I am an engineer, consequently on my feet nearly all day long.

Yours very respectfully,

JOS. HINKS.

BELOW-KNEE AMPUTATION.

WAYNE COUNTY, PA., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn your artificial legs twenty-two years.

I handled, one afternoon, one hundred and sixty barrels of apples, which would be a fair half-day's work for a sound man.

Yours truly,

C. A. CORTRIGHT.

BELOW-KNEE AMPUTATION.

YORK COUNTY, PA., Dec. 15, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been using an artificial leg of your make for eleven years. I am a tinner by trade. I can climb ladders and work at tin roofing.

The leg fits me to perfection, and the first time I put it on I walked without a cane, and do not use a cane now. I consider the rubber foot superior to any other, as there is no ankle joint to get out of order. I want none but your manufacture.

Gratefully yours,

JACOB W. SELAK.

ANKLE-JOINT AMPUTATION.

Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—The aluminum artificial leg you made for me gives good satisfaction. It is made very strong, neat, and light. I can walk so easy that the people do not know whether I have an artificial or natural limb.

Yours respectfully,

Allentown, Pa. STEWARD J. METZGER.

ANKLE-JOINT AMPUTATION.

MERCER COUNTY, PA., Dec., 1895.

DEAR SIR:—I am now attending gate on N. Y., P. & O. R. R., and the foot you made for me is doing my work first class, and is giving excellent satisfaction.

Very truly,

JNO. WELCH.

INSTEP AMPUTATION.

HARRISBURG, PA., Dec. 14, 1895.

A. A. MARKS:

DEAR SIR:—I am glad to testify that your appliance for my foot, a Chopart's amputation, is the finest article in the market. I am a fireman on the P. R. Road and do my work thoroughly.

I am, very respectfully yours,

C. P. HUTCHINSON.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

CENTRE COUNTY, PA., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have used an artificial arm made by you for fifteen years. There was no difficulty in obtaining correct size from your system of measurements. My arm is off halfway between elbow and shoulder.

Yours truly,

REV. S. H. EISENBERG.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

MONROE COUNTY, PA., Dec. 19, 1895.

MR. A. A. MARKS.

DEAR SIR:—I am wearing one of your patent arms, and can say that they are very strongly made and very durable.

My arm was amputated close to the shoulder, with scarcely stump enough for use. I am satisfied with the rubber hand.

Respectfully yours,

S. BUSH.

BELOW-ELBOW AMPUTATION.

NORTHAMPTON COUNTY, PA., Dec. 16, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—I can recommend your artificial arms. Mine gives me great satisfaction. I have seen many other arms, but none of them are equal to the one you have made for me.

I have the arm thirteen years, and the arm is good for some time to come. I would not do without it under any consideration. My amputation is between the wrist and elbow. I am working in the office of the L. V. R. R. Co., and my artificial arm comes in very good in holding and folding all kinds of paper, which is required in my profession.

I am, yours truly,

JOHN A. SEIBEL.

BELOW-ELBOW AMPUTATION.

WASHINGTON COUNTY, PA., April 4, 1896.

MR. A. A. MARKS:

DEAR SIR:—I have tried four or five of the leading manufacturers' patents of artificial arms.

There are none that I have tried that gives me the satisfaction that yours have. All of these clap-trap, cat-gut arrangements will get out of order in a very short time.

Yours very truly,

ISAAC VANCE.

WRIST AMPUTATION.

Dec. 19, 1895.

A. A. MARKS, ESQ., New York.

DEAR SIR:—It gives me great pleasure to say that I am wearing one of your patent arms. I feed a planing machine, handling from eighty to one hundred feet of heavy yellow pine lumber in one minute without any inconvenience.

Respectfully yours,

Philadelphia, Pa. JOSEPH SHERIDAN.

RHODE ISLAND.

ABOVE-KNEE AMPUTATION.

NEWPORT, R. I., Sept. 30, 1895.

A. A. MARKS :

DEAR SIR :—I take pleasure in saying that Chas. White received his artificial leg a short time ago. He is pleased with it and has reason to be, for it is an excellent piece of workmanship.

Respectfully yours,

CHAS. A. GILLEN.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

WASHINGTON COUNTY, R. I., Aug. 11, 1895.

A. A. MARKS :

DEAR SIR :—I cannot say enough in praise of the artificial leg you made for me, I am so well pleased with it. I can get along with it first rate. I have no need of using a cane.

Yours,

GEORGE B. SHERMAN.

ABOVE-KNEE AMPUTATION.

WASHINGTON COUNTY, R. I., Dec. 26, 1895.

A. A. MARKS, ESQ.

DEAR SIR :—I do not see why anyone needs a testimonial to convince them that your legs are the best, when they need only to consider their construction to be convinced that is so.

Yours respectfully,

O. S. CHAPMAN.

BELOW-KNEE AMPUTATION.

Dec. 18, 1895.

DEAR SIR :—I have worn the artificial leg that I purchased of you in 1887, every day since, and I am glad to tell you that I am very much pleased with it in every way. Why, it actually surprises some of my friends to see the way that I get around with it without the use of a cane. I tell you that you don't want a cane at all. I don't want one. It is in the way.

Yours truly,

Providence County, R. I. H. C. MOWRY.

BELOW KNEE AMPUTATION.

Dec. 17, 1895.

DEAR SIR :—I wore three artificial limbs before I received yours.

Yours is the finest leg I ever wore for fitting and easy walking.

The rubber foot is the best I ever used.

My leg is off four inches below the knee and my weight is 216 pounds. I wore your first leg for over five years, and am now wearing the second one, and the first is good yet. I am janitor, and I have a great deal of walking to do.

Respectfully yours,

Providence, R. I. JOHN REYNOLDS.

PARTIAL-FOOT AMPUTATION.

Dec. 16, 1895.

A. A. MARKS:

I take great pleasure in recommending your aluminum artificial legs for instep amputations, for they are neat, light, and serviceable, and they far exceed the wooden ones formerly used. My occupation is that of a warp twister in cotton mill.

Respectfully yours,

Providence County, R. I. JOHN HOWARTH.

SOUTH CAROLINA.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

CHARLESTON, S. C., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have much pleasure in stating that the artificial leg I bought from you over twelve years ago has given me entire satisfaction. I have never lost an hour since I put your leg on. I never use a cane unless going a long distance from home.

Yours truly,

SEBASTIAN MONSERRAT.

ABOVE KNEE AMPUTATION.

Fitted from Measurements.

SPARTANBURG COUNTY, S. C., Aug. 3, 1894.

A. A. MARKS, New York.

DEAR SIR:—My artificial limb, I must say, fits the best of any artificial leg that I have ever had. I am,

Respectfully yours,

S. S. BEARDEN.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

RICHLAND COUNTY, S. C., Dec. 7, 1894.

A. A. MARKS, ESQ.:

DEAR SIR:—I really don't know whether to flatter myself or you; of course all belongs to you. Our legislature is now in session, and among them are many one-leged Confederate veterans (I am one myself); some of them are wearing artificial legs which make a great deal of noise when they walk, while I go along silently and serenely, with my hands in my pockets. I am,

Very respectfully,

JOHN GRAY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CHARLESTON, S. C., June 25, 1896.

A. A. MARKS:

DEAR SIR:—After wearing the artificial leg made by you for eighteen months I find it has proven in every way a success and is very satisfactory. I am,

Your obedient servant,

JOHN VENNING.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

HAMPTON COUNTY, S. C., Aug. 10, 1892.

MR. A. A. MARKS:

DEAR SIR:—I am well pleased with my artificial hand; it is a great success. I am glad to say that I have not been without it during the day since it was received. It gives me no trouble at all, and is of great assistance in my work.

I am, As ever,

H. F. BASS.

SOUTH DAKOTA.

BOTH LEGS AMPUTATED BELOW KNEES.

Fitted from Measurements.

BEADLE COUNTY, S. DAK., April 14, 1894.

A. A. MARKS:

I am very much pleased with my feet; I walk first rate with them. Last week I walked from Huron out to my farm, a distance of thirteen miles, and

No. 1229.

my feet never felt easier than when I got to the end of my journey. (Partial amputation of both feet.)

GEO. RISDON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

HUGHES COUNTY, S. DAK., March 12, 1894.

A. A. MARKS, New York City:

DEAR SIR:—I am pleased to record that after having successfully used your leg I find it far superior to any of my former limbs, the natural one only

excepted. I lay no claim to discovering your principle of limbs without ankle joints, but, for the last fifteen years, I so modified the limbs that the ankle had hardly any play. With the same effort I formerly made I can now walk much further; this I attribute to the rubber foot, and as for grace, bless your heart, there is no grace in any of them except yours. I walk strong and sure without assistance, fatigue, and that suits me.

You may tell the "boys" for me that if they would be healthy, wealthy, and wise, to get a rubber foot, that nothing so reconciles one for the loss of a limb or two as your rubber feet, ankleless artificial limbs.

Yours truly,

JOHN SUTHERLAND.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

UNITED STATES INDIAN SERVICE, PINE RIDGE AGENCY,
SHANNON, S. DAK., Dec. 19, 1895.

MR. A. A. MARKS:

DEAR SIR:—On September 18, 1889, I performed the operation of amputation of the left leg on Ceca Yamni (Peter Three Thighs), a Sioux Indian attached to this agency. He was a sufferer from necrosis of the tarsus, and a complete

No. 1230.

invalid, absolutely unable to stand. I did not succeed in getting his consent to operate until I told him about your excellent limbs, how he would be enabled to walk, run, ride, work, etc. In due time the stump healed, and I sent you measurements for his leg. It came by express, and I immediately adjusted it. To my surprise it fitted him perfectly, and at this writing he is going about among the Indians with as much ease and comfort as could be desired. Inclosed is a photograph in war costume, which he sends you with

his compliments, with a hope that it will be interesting to his race, and an example of what the "White Medicine Men" can do for his people.

Very respectfully,

Z. T. DANIEL, M. D.,
Agency Physician, U. S. Indian Service.

ANKLE-JOINT AMPUTATION. BOTH FEET.

Fitted from Measurements.

CUSTER COUNTY, S. DAK., Dec. 17, 1895.

SIR:—I have worn your artificial feet for ten years, and they have proved to be satisfactory. Could not do without them. I can do all kinds of farm work and get around naturally. Without your feet I could do nothing.

Yours respectfully,

FRIEND W. MEEKER.

TENNESSEE.

BOTH LEGS AMPUTATED; ONE KNEE BEARING, THE OTHER BELOW THE KNEE.

Fitted from Measurements.

SHELBY COUNTY, TENN., Dec. 21, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing a pair of your artificial limbs with rubber feet ever since 1884; they were made by measurements, and give full satisfaction in every respect. I am flagging for the M. & C. R. R., at Union Street crossing, and have not lost a day on account of my limbs, and have not had any repairing done to them since I got them. I get around so spry and fast that people don't want to believe that I wear artificial limbs: I can go up or down stairs, three stories, get on and off trains, go anywhere I want, and need no help.

Yours truly,

J. E. PATTERSON.

ABOVE-KNEE AMPUTATION.

MAURY COUNTY, TENN., Dec. 19, 1895.

A. A. MARKS, New York City:

DEAR SIR:—For over nineteen years I have worn continually an artificial limb of your make. I can cheerfully say that it has given perfect satisfaction. I am a dentist; my stump is but five inches long. I can stand at my dental chair and operate six hours a day with comparative ease.

Yours respectfully,

DR. ROBERT F. TAGGART.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

WASHINGTON COUNTY, TENN., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I lost my foot by a mowing machine over fifteen years ago. My foot was amputated three inches above the ankle. I was induced to get one of your limbs with a rubber foot, which I did, and am wearing it yet, which has been about fourteen years.

It has cost me about two dollars for repairs. I ordered it from your measurement blank, and it was a perfect fit.

I am, yours truly,

J. E. CRAWFORD.

BELOW-KNEE AMPUTATION.

Jan. 24, 1896.

MR. A. A. MARKS:

DEAR SIR: I will always feel thankful to you for your skill in fitting the artificial leg to me. I lost my right leg at the battle of Nashville, December 15, 1864. It would have amused you to see me back home among my people, to see them eyeing me with curiosity, wondering how my right leg should have grown out so suddenly with a foot on it. They were not aware that I had gone to New York to have you fit such to me.

Yours, with great respect,

CARROLL CHILDERS,
Nashville, Tenn.

BELOW-KNEE AMPUTATION.

ANDERSON COUNTY, TENN., Dec. 6, 1887.

MR. A. A. MARKS:

DEAR SIR:—I want to say to you that I am well pleased with the artificial leg furnished by you.

I consider your rubber feet and hands the best yet invented. I received a leg from you two years ago, fitted from measurements sent to you. I have used

No. 1231.

your leg at nearly all kinds of work, such as plowing, spading, hauling logs, and other hard work. I have walked twenty-five miles in a single day. The rubber foot lasts longer and takes less repairs than anything I know about.

Yours respectfully,

LEWIS C. COX.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

BEDFORD COUNTY, TENN., Jan. 5, 1896.

MR. A. A. MARKS:

DEAR SIR:—After twelve years of constant use in wearing your patent artificial arm with improved rubber hand, I am prepared to give testimony as to its merits. It has never cost a cent for repairs. As to usefulness, it equals my anticipation.

Regards, etc.,

GEO. E. WAITE,

TEXAS.

BOTH LEGS AMPUTATED BELOW THE KNEES.

Fitted from Measurements.

HOUSTON, TEX., Jan. 5, 1896.

MR. A. A. MARKS:

DEAR SIR:—I received the limbs on the first of February, 1886, and put them on, and can say that my health is better, and I can walk anywhere I want to, night or day. I can go upstairs any height I want to.

I can walk three miles per hour; they never hurt me. I am a laborer, and my work is quite hard. BEN. J. NICKERSON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

AUSTIN, TEX., Dec. 28, 1895.

A. A. MARKS:

DEAR SIR:—The artificial leg you made for me some time ago fits nicely, and I am well pleased with it.

I am attending to business every day from morning till late at night without the assistance of a cane, and am able to do some tolerably heavy lifting and carrying. Yours respectfully,

GEORGE MARTENS.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

AUSTIN, TEX., Dec. 18, 1895.

A. A. MARKS, New York:

DEAR SIR:—I am using one of your legs with rubber foot, and like it better than the old style. I have used artificial limbs for twenty-three years. My limb is off about halfway from ankle to knee.

Respectfully,

A. R. GOSSARD.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

DALLAS, TEX., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have been using one of your patent legs since 1871; it has never given me any trouble; I can walk with an ease that is surprising to myself. The india-rubber foot is, in my opinion, the next thing to life itself.

I have used other artificial legs that had ankle joints, heel-cords, etc., that were clacking, breaking, and making a very obnoxious noise.

Yours very truly,

B. T. HUMPHREYS.

BELOW-KNEE AMPUTATION.

GALVESTON, TEX., Dec. 19, 1896.

MR. A. A. MARKS:

MY DEAR SIR:—I lost my foot by the C. C. & S. Fe R. R., over three years ago. My foot was amputated four inches above the ankle. I was induced to get one of your artificial limbs with rubber foot, which I did, and am very much pleased with it. It was fitted from measurements. I am able to do almost anything on it. Yours truly,

A. A. TITZE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

LLANO COUNTY, TEX., Dec. 19, 1895.

DEAR SIR:—I have been wearing your patent artificial leg for over fifteen years with the utmost satisfaction. I can go anywhere I want to. I can run, jump, and climb.

Yours truly,

W. E. SIMPSON.

BELOW-KNEE AMPUTATION.

TRAVIS COUNTY, TEX., Dec. 15, 1895.

A. A. MARKS:

DEAR SIR:—I received one of your legs made from measurements November, 1888, and it has proved to be a first class leg in every respect. I am a clerk in a hardware store and am on my feet all day. I go about without a cane and do some heavy lifting.

Your respectfully,

H. A. ZIMPELMAN.

UTAH.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

MILLARD COUNTY, UTAH, June 29, 1894.

A. A. MARKS:

DEAR SIR:—Two years ago I put on one of your artificial limbs. I can truthfully say it has been a great help to me, and I am confident that there

No. 1232.

are none better. I get along without any other assistance, and am able to attend to an acre and one half of garden. In fact, to make a long story short, everything is as you said it would be, and I am satisfied.

Gratefully,

DAVID DAY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WEBER COUNTY, UTAH, Dec. 19, 1895.

A. A. MARKS:

DEAR SIR:—I have used one of your artificial legs for over eleven years. The rubber foot works almost as well as the natural one, and after I got used to it I was surprised how easy it was to get along with my usual work on the farm.

Yours respectfully,

TIMOTHY O'NEIL.

VERMONT.

ABOVE-KNEE AMPUTATION.

FRANKLIN COUNTY, VT., Dec. 17, 1895.

A. A. MARKS:

DEAR SIR:—During the past fourteen years I have worn two artificial legs. The point of amputation is about halfway between the knee and hip, and although my occupation is very laborious, yet I experience very little inconvenience, owing to the perfect fit you gave me, and excellent manner in which the leg works, especially the rubber foot.

Gratefully yours,

CHARLES LUCIA.

BELOW-KNEE AMPUTATION.

Dec. 17, 1895.

MR. MARKS:

DEAR SIR:—From my twenty-one years of constant labor on your patent limb on a farm, I can truly say your leg is the best. I had one of ———'s before I got yours, and it did well for a year. It was the old style leg with ankle joint. It was out of repair very often, and it got so I did not dare to go out on the street with it.

Yours truly,

Burlington, Vt. WM. B. GILL.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CALEDONIA COUNTY, VT., Dec. 19, 1895.

MR. MARKS:

DEAR SIR:—The artificial leg you fitted from my measurements fits me perfectly. I walked off with it from the start, and have had no trouble with it since. If anyone has a leg taken off that I know of, I shall certainly send them to you.

Yours truly,

C. H. BOLLES.

BELOW-KNEE AMPUTATION.

LAMOILLE COUNTY, VT., Dec. 16, 1895.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—I have worn your artificial limbs for twenty-two years, and during that time I did not have to pay out anything for repairs.

My business for four years was farming, doing all kinds of work. Two winters I worked on the mountain cutting and skidding logs, which was a very trying test for the limb.

I can walk five or six miles without any trouble.

Yours very truly,

EDWIN A. GALLUP.

BELOW-KNEE AMPUTATION.

ORANGE COUNTY, VT., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—Before wearing your artificial leg I wore two with ankle and toe joints, cords, and springs. They were constantly out of repair. Have worn yours with rubber foot twenty years. My leg is amputated four inches below the knee.

Respectfully yours,

LEONARD H. GOODRICH.

ABOVE-ELBOW AMPUTATION.

FRANKLIN COUNTY, VT., Dec. 18, 1895.

DEAR FRIEND MR. MARKS:

I lost my arm by the cars when I was very young, and I have only five or six inches of the arm left from the shoulder. The arm I purchased of you is very satisfactory.

I can carry a heavy satchel, and I can do many things that make the arm worth many times the cost of it. I have had my arm over nine years, and it has never hurt me or bothered me. I am a telegraph operator in the train despatcher's office.

As everyone knows that operators have to write very rapid, I do not know what I would do if it was not for the hand. I cannot half testify to the merits and comfort and pleasure I have taken in your arm.

Yours very truly,

HOMER MCGREGGS.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

A. A. MARKS:

DEAR SIR:—When quite a young boy I lost my right hand. I have had several artificial ones, but nothing which suited me as well as the one made by you. My hand was made by sending you my measures and a kid glove.

I can truly say it has given perfect satisfaction. Is is just what you recommended it to be. I have recommended your work to others.

P. S. CUNNINGHAM.

Franklin County, Vt., Dec. 16, 1895.

VIRGINIA.

ABOVE-KNEE AMPUTATION.

Dec. 6, 1895.

A. A. MARKS:

DEAR SIR:—I would like to accentuate all I have said about your goods. The elapse of a good many years confirms my belief that yours are the best I know anything about. I have lately seen those on our streets who have for years used your artificial legs, and no one would ever suppose they were walking on anything but natural limbs.

E. A. CRAIGHILL,

Lynchburg, Va.

ABOVE-KNEE AMPUTATION.

NORFOLK COUNTY, VA., Dec. 17, 1895.

A. A. MARKS:

MY DEAR SIR:—I only have four inches of stump. Money can't buy this limb if I could not get another. I cannot say enough for the limb you made for me.

Occupation, farmer.

JOHN F. DOZIER.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

AUGUSTA COUNTY, VA., Dec. 16, 1895.

A. A. MARKS :

DEAR SIR :—This is to certify that I have been wearing an artificial arm for eighteen years ; have been wearing one of your improved rubber hands for nearly ten years. It has given entire satisfaction both in wear and comfort. I consider it one of the best artificial limbs I have even seen.

Yours truly,

J. H. SWORTZEL.

WASHINGTON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

KING COUNTY, WASH., Dec. 20, 1895.

A. A. MARKS :

DEAR SIR :—During the last eighteen years I have been obliged to wear a substitute. I tried the ——, then the ——, and got fairly disgusted with both of them ; one day I met a friend of mine, an old army captain, who persuaded me to get one of your patent. I consented, and have worn it ever since. Every step I take brings 183 pounds to bear on it, and still the foot is as flexible as ever ; in fact, it has given me entire satisfaction.

Truly,

THOS. R. HUGHES.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

KITSAP COUNTY, WASH., Feb. 18, 1891.

MR. A. A. MARKS :

DEAR SIR :—I am proud to say that your leg gives the best satisfaction. My occupation you know is farming ; I can do a good day's work with my leg.

Yours respectfully,

ED. GOOD.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

MASON COUNTY, WASH., Jan. 6, 1891.

A. A. MARKS :

DEAR SIR :—I have been using the leg since I got it and am pleased with it in every respect. One month after I received the leg, I was appointed as U. S. Indian Police, which office I now hold. I can do most any kind of work ; in fact I feel like a new man altogether,

Yours very respectfully,

FRANK H. PETERSON.

WEST VIRGINIA.

KNEE-BEARING AMPUTATION.

BERKELEY COUNTY, W. VA., Dec. 24, 1895.

A. A. MARKS :

DEAR SIR :—Now as to the merits of your rubber foot I will say they can not be excelled. The leg you made for me in 1870 was in constant use for fifteen years. The leg you made for me in 1875 I only commenced to wear in 1885, and am wearing it now. When the time comes for me to get another, I shall call on you to make it. Yours respectfully,

WILLIAM DEAN SMITH.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

GILMER COUNTY, W. VA., Dec. 17, 1895.

MR. A. A. MARKS, New York City:

DEAR SIR:—I have worn your patent leg with rubber foot for fifteen years. I walk with ease and alacrity.

I have been engaged in lumbering for the last ten years, riding horseback as much as four to five days out of each week from place to place, and then walking over logs to measure, etc.

Yours most respectfully,

JOHN S. BRANNON.

BELOW-KNEE AMPUTATION.

HARRISON COUNTY, W. VA., Dec. 16, 1895.

TO WHOM IT MAY CONCERN:

I have worn an artificial limb of Marks' patent for ten years, and I find it superior in every respect to any other. As merchant I am on my feet almost all day long, and do not suffer any inconvenience. This I think is owing to the fact that the foot is of rubber. Respectfully,

M. J. FRANCIS, P. M.

BELOW-KNEE AMPUTATION.

LEWIS COUNTY, W. VA., Dec. 15, 1895.

A. A. MARKS:

SIR:—I have worn artificial legs since 1864. The first order that I gave was for one of ——'s legs, which was tolerable. The next I ordered was one of yours; it was very good. But, like all others, thinking there might still be a better one, I ordered one of ——, and it was a perfect nuisance, and then, 1881, fell back on your old stand-by leg. This I am still wearing.

JACOB STEALEY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WEBSTER COUNTY, W. Va., Dec. 18, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am well pleased with your artificial leg. It enables me to walk with comfort and ease. My walk is natural. I can ride with the same comfort that I did with my natural leg. Occupation is farming.

Yours respectfully,

LEVI SKIDMORE.

WISCONSIN.

BOTH LEGS AMPUTATED BELOW THE KNEES, AND PART OF ONE HAND.

Fitted from Measurements.

EAU CLAIRE COUNTY, WIS., Dec. 20, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn your limbs now for ten years and am well satisfied with them. I can walk right along with them. I have astonished a great many of my friends, and I have met strangers that never suspected anything of me being artificial. I don't know what I would do without them. They are almost equal to the natural ones.

Yours truly,

WILLIAM J. MCDONOUGH.

BOTH LEGS AMPUTATED BELOW THE KNEES.

LA FAYETTE COUNTY, WIS., Mar. 7, 1896.

MR. A. A. MARKS :

When but a mere boy of nine years of age, I lost both my feet through a too-close contact with a mower. Since then, for seventeen years, I have worn artificial limbs. I first tried a Chicago firm's make, then yours, which I have worn for eleven years.

Your limbs were fitted perfectly from measurements ; they are very comfortable, and do not irritate my stumps. The feet being of rubber, there is not the annoyance caused by feet with a complicated spring attachment.

J. C. NODOLF.

LEG ABOVE KNEE.

JEFFERSON COUNTY, WIS., Dec. 18, 1895.

A. A. MARKS :

DEAR SIR :—I have your leg since 1885, and it is a good leg yet.

M. S. MOSES.

ABOVE-KNEE AMPUTATION.

SAUK COUNTY, WIS., Dec. 8, 1895.

A. A. MARKS, ESQ., New York :

DEAR SIR :—I have worn an artificial leg of your manufacture since 1881, and so far am well pleased with it.

Respectfully yours,

C. KUONI.

BELOW-KNEE AMPUTATION.

DANE COUNTY, WIS., Dec. 18, 1895.

A. A. MARKS :

DEAR SIR :—You have made three artificial limbs for me, and they have all given complete satisfaction. The first leg I wore was a —— ; before I had worn it two years you could hear the ankle rattle for a long distance. The ankle joint in an artificial limb is a nuisance. I believe the rubber foot to be the best and safest. Yours respectfully,

HARRISON SAYLES.

BELOW-KNEE AMPUTATION.

GREEN COUNTY, WIS., Dec. 21, 1895.

MR. A. A. MARKS :

DEAR SIR :—I have worn your patent leg for over ten years with perfect satisfaction. I want no other kind. I have worn an artificial leg nearly thirty-three years, and was always bothered with the springs and ankle joint giving out. Yours has never troubled me any, and is apparently as good as new. The rubber foot is almost like the natural one. No dropping of toes, no swinging side-wear, but straight forward over rough ground or on sidewalk, or up and down hill. Very respectfully yours,

BENJAMIN WICK.

BELOW-KNEE AMPUTATION.

IOWA COUNTY, WIS., Dec. 17, 1895.

MR. A. A. MARKS :

SIR :—I will state to you that I never had such a good fit for the last twenty-nine years. My leg is off nine inches below the knee. Ten years ago I was in your office.

The rubber foot cannot be excelled.

Yours truly,

DANIEL LYNCH.

BELOW-KNEE AMPUTATION.

JEFFERSON COUNTY, WIS., Dec. 17, 1895.

MR. A. A. MARKS:

DEAR SIR:—It is now over twenty-eight years ago since I bought my first artificial leg from you. I have tried several other makes in the meantime, but none of them have given me such satisfaction in any way. I have found yours the easiest and most comfortable, both for wear and walking, and also the most durable. Have been engaged in the stave and lumber manufacturing business all this time. I had to be around on my feet all day.

Yours truly,

CHRIS. MAY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

LA FAYETTE COUNTY, WIS., Jan. 23, 1896.

A. A. MARKS, ESQ., New York:

DEAR SIR:—I am doing all my housework, carrying wood, water, etc.

I have worn artificial limbs since 1872. I am now wearing the fourth limb, which I purchased of you on or about July, 1885.

It is giving me much better satisfaction than any of the other three which I purchased from different firms. My limb is amputated five inches above the ankle joint. You fitted me perfectly from measurements.

Respectfully yours,

MRS. WM. KRAKE.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

MONROE COUNTY, WIS., Dec. 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I have worn the leg you made for over twelve years, and am exceedingly well pleased with it. This is very well, considering that I have been laboring very nearly every day since I got it. My leg is amputated below the knee. I can heartily recommend your artificial limbs to anyone in need of such an article.

Yours respectfully,

JOHN OLSON.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

WINNEBAGO COUNTY, WIS., Dec. 18, 1895.

A. A. MARKS, ESQ., New York:

DEAR SIR:—I have used one of your legs since 1881 and it has given perfect satisfaction. My leg was amputated below the knee, June, 1881, and measures for the same were taken before the stump had healed.

I have worn the leg every day since. I am seventy-nine years old, and can walk without a cane or crutch. I am on my feet in the store from six o'clock in the morning till eight o'clock in the evening, and never think of using a cane except when I go on the street.

The cost of repairs are nominal; a few dollars covers all expended on it. I think the rubber heel and toe and no ankle joint a great thing for people obliged to wear artificial limbs.

Yours very truly,

K. DICHMAN.

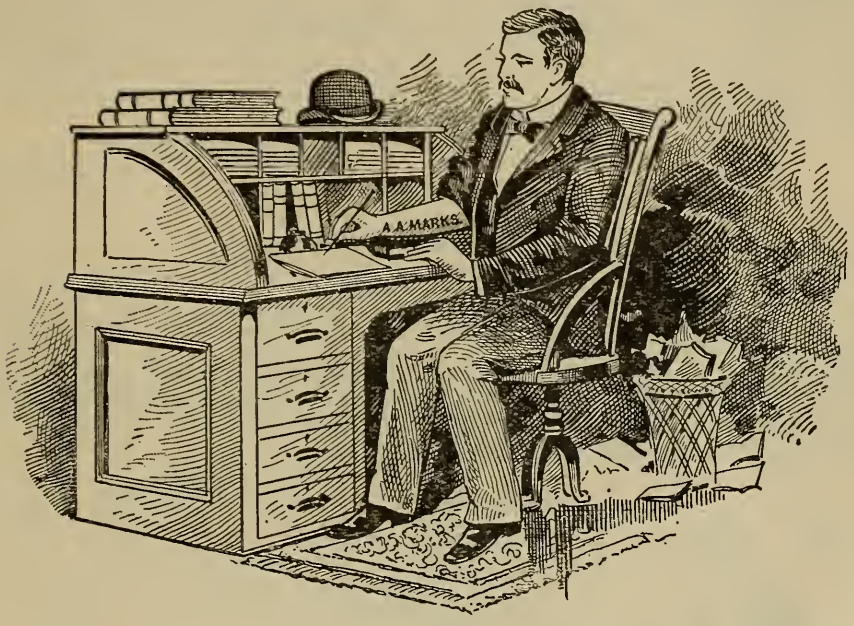
BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

DOUGLAS COUNTY, WIS., Dec. 19, 1895.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—I think my arm in every particular is a grand success, and I will always be pleased to speak in its praise to my fellow-unfortunates. No



No. 1233.

doubt you will be greatly surprised to know that I wrote this entire letter and addressed envelope with my hand. I think that if you will compare this with former letters of mine now in your possession, you will pronounce this the better writing of the two.

Yours truly,

GEO. H. PURCHASE.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

MARINETTE COUNTY, WIS., Dec. 5, 1887.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—I take pleasure in stating that the arm you sent me was far beyond my expectations, and I do cheerfully recommend your artificial limbs to anyone who may need them. I am a painter by profession.

Yours respectfully,

JOS. E. KEEFE.

BELOW-ELBOW AMPUTATION.

MILWAUKEE, WIS., Dec. 17, 1895.

A. A. MARKS, New York City:

DEAR SIR:—In July, 1886, I bought of you an artificial hand, for amputation below the elbow. I have worn it constantly since. On many occasions it has been mistaken for a natural hand. As a glove is constantly worn, the hand suffers little from wear. I am satisfied with it, and would willingly answer any questions. Yours,

J. H. FRIAR.

WYOMING.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

UINTA COUNTY, WYO., May 6, 1896.

MR. A. A. MARKS:

DEAR SIR:—I am getting nearer perfection on the leg made by you every day and am much pleased with it. I do every kind of work I ever did before I lost my leg, and don't hesitate to tackle any work that comes in sight. I am only slightly inconvenienced. I can run, jump, dash, go over a train, shovel coal, shear sheep, in fact everything I ever did.

Yours very truly,

R. LEE CRAIG.

KNEE-BEARING AMPUTATION.

Fitted from Measurements.

SWEETWATER COUNTY, WYO., Sept. 25, 1894.

MR. A. A. MARKS:

DEAR SIR:—A little incident happened as I walked down the street the other day which I here will tell you. I heard one man ask another if he could tell which leg I had lost, and he stood and looked and said he could not. This makes me better pleased than ever with your leg. I am,

Yours respectfully,

J. E. PEARSON.

CANADA.

ABOVE-KNEE AMPUTATION.

QUEBEC, CANADA, Dec. 5, 1895.

A. A. MARKS, ESQ.:

DEAR SIR:—I have been wearing one of your artificial limbs over eleven years with the utmost satisfaction. Point of amputation about six inches from the hip joint, and I weigh two hundred and sixty-nine pounds. I am a watchman in the G. T. Ry., and work from 7 at night until 7 in the morning.

Respectfully,

G. P. HAMEL.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

PETITE RIVER, NOVA SCOTIA, April 7, 1888.

A. A. MARKS:

DEAR SIR:—I am happy to inform you that the artificial leg you made for me works splendidly. I feel like a new man on it. This feeling is encouraged by the kindly comments of my friends. I regard the rubber foot as a great improvement.

Yours truly,

W. S. FREEMAN, M. D.

BELOW-ELBOW AMPUTATION.

CUMBERLAND COUNTY, N. S., CANADA, Dec. 19, 1896.

MR. A. A. MARKS:

DEAR SIR:—It affords me much pleasure to say that I am willing that you should print my testimony in regard to the arm you manufactured for me. I can also state that I have been wearing it now for eight years with the best of satisfaction.

Yours truly,

S. E. EAGAND.

BELOW-ELBOW AMPUTATION.

CAPE BRETON, N. S., CANADA, Jan. 3, 1896.

A. A. MARKS, ESQ.:

DEAR SIR:—I am happy to say that, having worn one of your legs for the last fourteen years, I feel convinced that no better can be made. I have been for quite a while in the company of people who never suspected that I was dependent on a "cork leg" (as they *will* call it) for support. The limb you furnished the boy Daniel McLean from measurements taken by me has given good satisfaction, and he runs around with his playmates almost as if he had never met with a misfortune.

Yours truly,

R. A. H. MACKEEN, M. D.

BELOW-KNEE AMPUTATION.

MONTREAL, CANADA, July 30, 1896.

MR. A. A. MARKS:

DEAR SIR:—It affords me great pleasure to add my testimonial to the long list that you already have. I am a professional prestidigitateur. When I lost my leg, I realized the importance of getting an artificial one that would imitate nature in shape and action as well as possible. I traveled a great deal and examined the works of most of the manufacturers, and

finally concluded that I could get the best results by wearing one of your legs with rubber foot. I have worn the leg nearly five years, and many of my most intimate friends do not know that I ever lost a natural leg. When I appear on the stage my steps are elastic and never betray the fact that I wear an artificial leg. After having worn your limb about six weeks, I invited the surgeon who amputated my limb to witness my performance; he invited in turn his medical class. When I was called upon to show my artificial limb, you should have seen the expression on those students' faces—they could hardly believe it. I am,

Your obedient servant,

MONS. F. J. BERNIER.

BELOW-KNEE AMPUTATION.

MANITOBA, CANADA, Jan. 26, 1896.

DEAR SIR :—After wearing one of your artificial legs for thirteen years continuously, giving it the hardest of usage, and having worn one of the movable ankle-joint artificial legs previous to getting one of yours, I am in a position to give an opinion on the merits of each. I can recommend your artificial legs with rubber feet in preference to anything that I have seen or heard of as a substitute for the natural limb.

Yours respectfully,

CHAS. O. EVANS.

BELOW-KNEE AMPUTATION.

QUEBEC, October 29, 1893.

A. A. MARKS, ESQ.:

DEAR SIR :—I take great pleasure in recommending your artificial limbs, especially for their durability. My left leg is amputated six inches below the

knee joint. I have worn one of your limbs since 1888. I am employed as signalman and attend to my duties without the least trouble.

THOS. FEENEY.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

ONTARIO, CANADA, Dec. 16, 1895.

MR. A. A. MARKS, New York :

DEAR SIR :—I procured a leg from you in 1876, for amputation four inches below the knee. I have worn your make of leg ever since.

I am well pleased in every way. I think the rubber foot a great improvement on the ankle joint. As you are aware, I bought a second leg from you about ten years ago. It suits also very well. I have not been a whole day on crutches in twenty years. Yours respectfully,

F. S. REES.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

QUEBEC, CANADA, Dec. 16, 1895.

A. A. MARKS, ESQ.:

MY DEAR SIR:—I might say that the first artificial leg you made for me in November, 1873, I wore constantly for twenty-one years. In all that time I don't think that it cost me over $10.00 for repairs. My occupation is a farmer, and I do all kinds of work that is usually done on a farm.

The leg, with all your later improvements, which you made from measurements which I sent you in 1894, is giving the best of satisfaction.

Yours sincerely,

THOS. H. NIXON.

NEWFOUNDLAND.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

NEWFOUNDLAND, Jan. 2, 1896.

A. A. MARKS:

DEAR SIR:—It affords me unqualified pleasure to state that, having worn one of your artificial legs with rubber feet for a period of ten years, I find it all that is practical and useful, deserving the highest commendation. There are no other artificial limbs that fulfill their purposes so thoroughly and satisfactorily as yours do.

Yours respectfully,

RICHARD DWYER.

ABOVE-KNEE AMPUTATION.

Fitted from Measurement.

NEWFOUNDLAND, Jan., 1896.

MR. A. A. MARKS:

DEAR SIR:—I have been wearing one of your legs a little over nine years, and I can do almost anything but fly. I have walked twelve miles a day. I go shooting, fishing, and I don't care for any man.

Yours very truly,

URIAH BURSEY.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

NEWFOUNDLAND, Jan. 14, 1896.

A. A. MARKS, ESQ.:

DEAR SIR:—Having had over twenty years' experience with artificial legs of various makers in the old country and in America, I find that the legs manufactured by A. A. Marks are the kind for me, for comfort, durability, gracefulness of movement, and satisfaction generally.

Besides my own, I have measured and ordered from you limbs for seven different persons, among the number one female, all of whom speak in the most flattering terms of the splendid capabilities of the limbs made by your firm.

Yours very truly,

H. C. MORRIS.

[N. B.—Mr. Morris is competent to take measurements and attend to the details of ordering, receiving, and adjusting artificial limbs; any person in need can place himself under his attention with the assurance of receiving proper care.—A. A. M.]

THE FLEMING BROTHERS, EACH WEARING TWO ARTIFICIAL LEGS FOR AMPUTATIONS BELOW KNEES.

Fitted from Measurements.

Newfoundland fishermen remember well the cold storm that set in about the first of April, 1888. It was then that Edward and Peter Fleming, brothers and fishermen of Forbay, met with a thrilling experience that deprived them of their lower extremities and nearly cost them their lives.

They were fishing from the ship's yawl off the coast of Newfoundland, when a storm suddenly came upon them and drove them from their location and away from the relief of the vessel. Twelve days they drifted about at the mercy of the cold, wind, and ocean—famished, athirst, and frozen; nothing to eat, nothing to drink, no succor, no hope. When despair and suffering had nearly exhausted them, a bark bound for Quebec picked them up and cared for them the best they could; but their sufferings were not alleviated until they were placed in the Quebec Hospital, where it was found necessary to amputate both legs of each. In course of time Peter and Edward sent their measurements to A. A. Marks of New York for two pair of artificial legs.

The letter printed below tells the results.

NEWFOUNDLAND, Oct. 29, 1895.

MR. A. A. MARKS:

DEAR SIR:—In regard to the artificial limbs you made for me six years ago, they are wearing well yet. They never cost me one cent for repairs since I got them. I was speaking to several men on crutches, and I told them that I had two of your limbs. They were surprised and wished they could get the like of them. I do a great deal of walking around the ground in summer time. I cannot praise your limbs too highly, for they are a great comfort.

Yours truly,

EDWARD FLEMING.

MEXICO.

ABOVE-KNEE AMPUTATION.

(Translated from the Spanish.)

ORIZABA, MEXICO, Dec. 20, 1895.

A. A. MARKS:

DEAR FRIEND:—I can assure you to-day that in this world nobody could construct apparatus such as yours, which are so useful, so easy to wear, and so perfect that they bear a great resemblance with the natural ones. Consequently I do not feel surprised to hear that they have always obtained the first prizes when presented in the exhibitions, as they only reveal justice and veneration to the acknowledged merit of your limbs. Therefore, I heartily congratulate you and remain once more your faithful friend,

ENRIQUE GUASP DE PARIS.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

(Translated from the Spanish.)

ZACUALTIPAN, MEXICO, Dec. 29, 1895.

A. A. MARKS, ESQ., New York:

DEAR SIR:—I beg to say the leg you made me is much more satisfactory than the one I used before. I can walk perfectly with it, although the ground is very uneven here. I feel very grateful to you, as all should be who have been relieved by you as I have been, after so much suffering.

Respectfully,

ADOLFO PEREZ.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

Danced at his wedding.

(Translated from the Spanish.)

SANTA ROSALIA, MEXICO, Sept. 5, 1887.

A. A. MARKS, New York :

DEAR SIR :—When I gave my order I never imagined that an artificial leg could form so perfect a substitute for the natural one in walking, riding on horseback, and even dancing ; I supposed it would merely serve to hide the defect.

For your satisfaction and my own I would beg to state that experience has demonstrated to me the superiority of the artificial legs with the rubber foot, because they combine simplicity of construction with stability and ease in walking, aside from the consideration of their extreme durability. I seize this opportunity of expressing my gratitude toward yourself for having devoted your energies to the alleviation of mankind in a branch so important as that of manufacturing artificial limbs, the construction and adaptation of which you so thoroughly understand.

Very sincerely yours,

ANTONIO ALARCON.

COSTA RICA, C. A.

ABOVE-ELBOW AMPUTATION.

Fitted from Measurements.

COSTA RICA, C. A., Feb. 8, 1896.

A. A. MARKS, New York City, N. Y. :

DEAR SIR :—I have the pleasure of stating that immediately after having sent you the measurements for my left hand, amputated two inches below the shoulder, I received from you in the month of January, 1885, an artificial rubber limb, which fits me perfectly well, and serves me up till now without any repairs at all. By reason of my occupation necessitating my frequent appearing in public places, I can fully appreciate what a boon your work is doing to humanity.

I am, gentlemen, yours thankfully,

JOSE MONGE REYES.

SAN SALVADOR, C. A.

ABOVE-KNEE AMPUTATION.

PEREZ & PARRAGA.

SAN SALVADOR, CENTRAL AMERICA, July 14, 1896.

MR. A. A. MARKS, New York :

MOST ESTEEMED SIR :—It is nineteen years since I obtained an artificial leg from you. During this period I have not had an opportunity to find the least fault with it. I walk very much and without a cane or support. I suffer no pain or uneasiness from it.

Since I have returned to Central America I find it necessary to make long journeys on horseback. In this the leg has assisted me very much. I pride myself on my easy and graceful movements, and the facility with which I mount and dismount.

The india-rubber foot which is on the artificial leg is a most excellent invention ; without it I question my ability to walk with safety in this country, the streets are so very rough and stony.

Your attentive friend,

MANUEL A. PARRAGA.

PERU, S. A.

LETTER FROM THE SON OF THE PRESIDENT OF THE REPUBLIC OF PERU.—ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

LIMA, PERU, SOUTH AMERICA, Nov. 25, 1885.

MR. A. A. MARKS, New York City :

MY DEAR SIR :—I take great pleasure in assuring you that the artificial leg which I ordered of you to replace the one I lost in the engagement of August 27, 1884, has proved to my entire satisfaction.

It is just that I should recommend your work, since I have been enabled to avail myself of it to such advantage.

Yours very truly,

ABSOLON M. YGLESIAS.

CHILE, S. A.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CERRO BLANCO, CARRIZAL BAJO,
CHILE, S. A., August 24, 1887.

MR. A. A. MARKS, New York :

DEAR SIR :—The fit is perfect and my son is able to use the leg with the greatest comfort.

My son begs me to tender you his most earnest and heartfelt thanks for the blessing that you have been the means of rendering to him.

Yours very faithfully,

E. T. MARTIN.

CUBA.

KNEE-BEARING AMPUTATION.

Fitted from Measurements.

SANTIAGO DE CUBA, Feb. 21, 1896.

MR. A. A. MARKS :

DEAR AND MOST HONORED SIR :—Gratitude is one of the noblest sentiments of the human heart. My duty is not only to express my gratitude to you, but to pay a tribute of justice to merit.

Every day I am more thankful for the leg of your manufacture which I am using. I remain,

Your affectionate and obedient servant,

JOAQUIN RICALO MUGUERCIA.

JAMAICA, W. I.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

JAMAICA, W. I., Jan. 15, 1896.

I have worn one of the Marks' artificial legs with rubber foot for eleven years, and must accord to him all the merits in the line of the manufacturing of artificial limbs, its durability, its ease, and simplicity.

I take my usual pleasure in sporting, going over hills and dales without the sign of fatigue or inconvenience.

I am a carpenter and do a large amount of walking, and my artificial leg has a great deal of wear and tear.

R. D. MOTHERSILL.

WEST INDIES.

KNEE-BEARING AMPUTATION.

Fitted from Measurements.

PORTO RICO, May 20, 1896.

MR. A. A. MARKS:

DEAR SIR:—I see no reason why my name should not appear in your new treatise, since from 1882 until to-day I have used the same artificial leg without having sustained any deterioration in that time. Expressing to you my most sincere thanks for the good service that limb has given to me, by which I work and earn my daily bread, I remain thankfully,

Your affectionate friend, etc.,

JOSE MARIA LEBRON.

ENGLAND.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

GLADSTONE TERRACE, QUEEN'S ROAD, RUNCORN,
CHESHIRE, ENGLAND, Dec. 26, 1895.

DEAR SIR:—I have now worn your leg for thirteen years, and am very glad to say I am quite satisfied with it. I was fitted from measurements. The point of amputation is about two inches above the left knee.

I am glad to be able to say the cost of repairing the limbs made by you is so little that I could not attempt to reckon it up.

Yours truly,

TO A. A. MARKS, ESQ. WALTER LACY.

IRELAND.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

BELFAST, IRELAND, June 27, 1884.

DEAR SIR:—The leg arrived some time about the latter end of June, 1875, and I have been wearing it ever since. I would like to get another just like it. The limb I have has a rubber foot for amputation below the knee. It is a pity you have not an agent here, for there is only one party in this city who makes artificial legs, and they are not to be compared with yours for durability, neatness, and comfort.

Trusting to hear from you soon,

Yours respectfully,

DR. MARKS. SAMUEL MCKEE.

HOLLAND.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

AMSTERDAM, HOLLAND, Nov. 23, 1887.

MR. A. A. MARKS, New York:

DEAR SIR:—I take much pleasure in certifying that the two new legs you furnished me from measurements, give me great satisfaction in every respect. I have never seen legs of better construction, and I do not believe that any other kind would need less repairs.

The rubber foot and the knee joint are far superior to all others I ever saw; hence, I can strongly recommend your highly respectable firm to all others. I lost my left leg above knee, in the year 1872.

Respectfully yours,

FRANCIS HERCKENRATH.

GERMANY.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

LUBECK, GERMANY, Jan. 2, 1896.

A. A. MARKS, ESQ., New York City:

DEAR SIR:—In regard to the artificial hand I got of you nine years ago, I can say it exceeds my expectation.

If I were compelled to work for my living the rubber hand would be of great use in any occupation. I recommend the rubber limbs to anyone who has had the misfortune to become crippled.

Yours respectfully,

N. MILDENSTEIN.

DENMARK.

ABOVE-KNEE AMPUTATION—STUMP ONE AND SEVEN-EIGHTHS INCHES LONG.

Fitted from Measurements.

MR. A. A. MARKS:

DEAR SIR:—When thirteen years old, I lost my right leg and used a common wooden leg till I reached forty-four years. By this time my attention was called to your artificial legs with rubber feet. I sent you my measure and got a leg from you, which I have used ever since, now for about six years. I am very well satisfied with it. It fits me admirably, and has required no repairs worth mentioning. The new suspenders are a real improvement. The stump, though only one and seven-eights inches, has never been sore.

Yours gratefully,

G. HEINEMAN.

Copenhagen, Denmark, Nov. 21, 1887.

NEW ZEALAND.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

AUCKLAND, April 12, 1896.

MR. A. A. MARKS:

DEAR SIR:—I have worn one of your legs since 1889, and have hardly had it off in all that time for a single day, and the last four years I have been living back in a new settlement where everything is very rough. I have often been fourteen hours on horseback at a time, either stock riding or packing, and during the winter do my share of bush felling. The rubber foot acts splendidly. I am, Yours faithfully,

NORMAN COLE-BAKER.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

SHAG VALLEY STATION, WAIHEMO, OTAGO, N. Z., July 10, 1884.

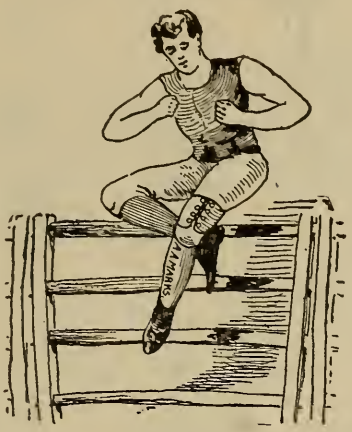
You may be pleased to hear that Mr. Trapski is successfully using the leg you made for him and can walk easily and quickly. He has every reason to be grateful to you for the trouble taken in his case, and will, I'm sure, readily recommend your firm to anyone suffering from a like misfortune. In this recommendation I shall gladly join.

FRANK D. BELL.

WANGANUI, N. Z., June 12, 1894.

A. A. MARKS:

DEAR SIR:—On September, 1892, you forwarded to me an artificial leg for my son. It has given the greatest satisfaction. My son has worn it continu-



ously; he can do all sorts of work, he can walk all day in a rough country and never becomes sore or lame. He has jumped ten flight of hurdles, 3 feet 3 inches high, in 120 yards. I have seen him jump a standard wire fence.

C. M. TAYLOR.

HAWAIIAN ISLANDS.

BELOW-ELBOW AMPUTATION.

Fitted from Measurements.

HAWAII, July 20, 1896.

MR. A. A. MARKS:

DEAR SIR:—I cannot give enough praise for the best material that you used in making my artificial hand, for it has stood the test well, and in many of my falls the artificial hand has saved me from accident. I am a cattle rancher. My hand was badly lacerated by being fouled with a lariat while lassoing wild cattle on the mountains here. The loss of my arm does not in any way deter me in my business. I remain, dear sir,

Yours very truly,

EBEN P. LOW.

STRAITS SETTLEMENTS.

ABOVE-KNEE AMPUTATION.

Fitted from Measurements.

SINGAPORE, March 16, 1896.

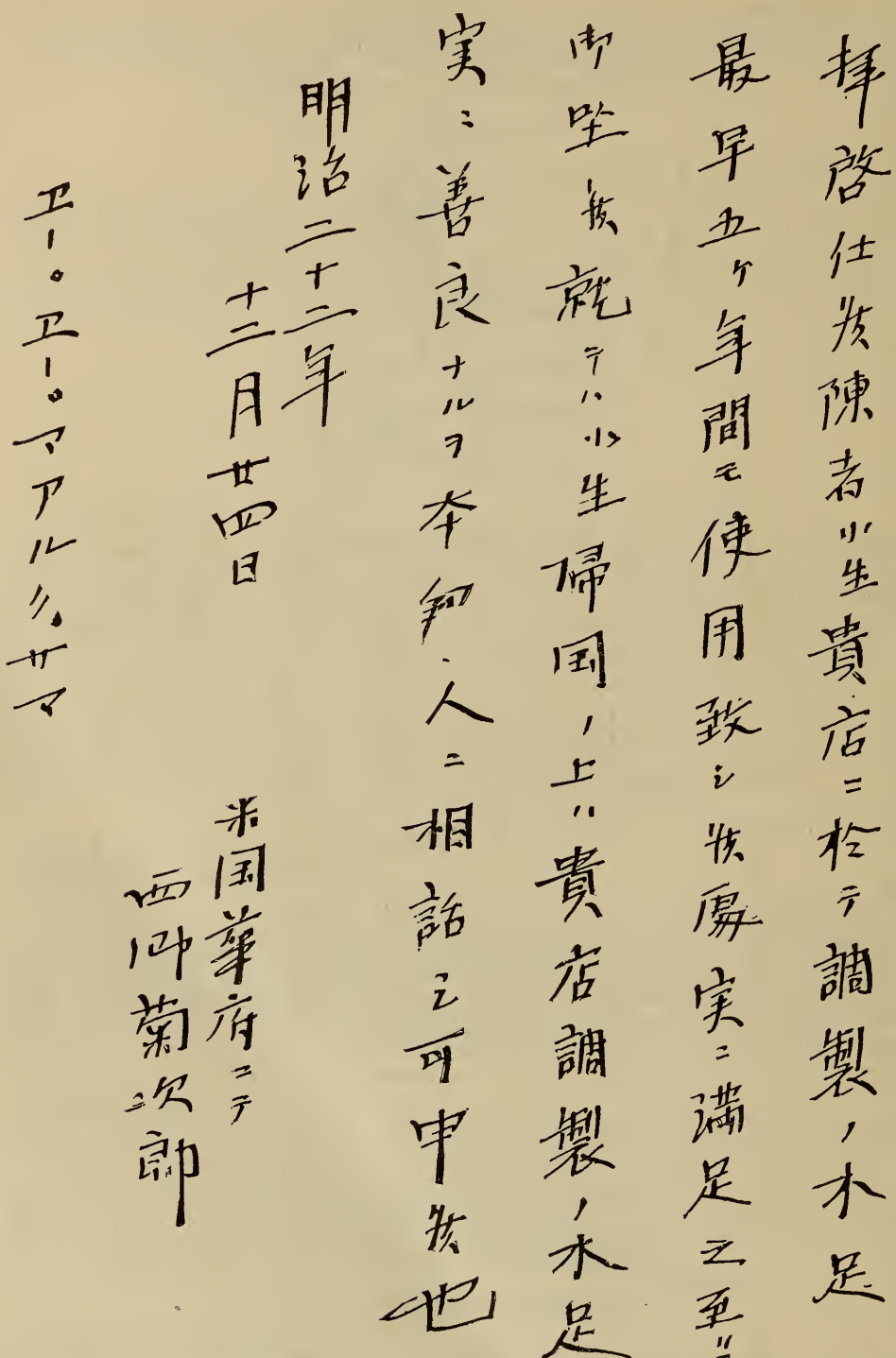
MR. A. A. MARKS:

DEAR SIR:—The first trial on your artificial leg I found to be a bit awkward, as I had been accustomed to those that had ankle joints, but after using it a while, I find that I can walk better and faster with your make. The knee joint is very safe in walking, as it does not bend suddenly when least expected, and the roller suspenders are far more comfortable to wear than the old style. I remain,

Yours respectfully,

J. H. SIDDONS.

JAPAN.



[TRANSLATION.]

Japanese Legation, WASHINGTON, D. C., Dec. 23, 1889.

MR. A. A. MARKS:

DEAR SIR:—I have worn an artificial leg with rubber foot made by you for the past five years, and assure you it has given me the best of satisfaction. I heartily recommend your work. I shall gladly speak well of it to all my countrymen afflicted as I am when I return to Japan.

Respectfully yours,

K. SAIGO.

ARTIFICIAL LEG, AMPUTATION ABOVE KNEE, FOR HIS EXCELLENCY THE COUNT OKUMA OF JAPAN.

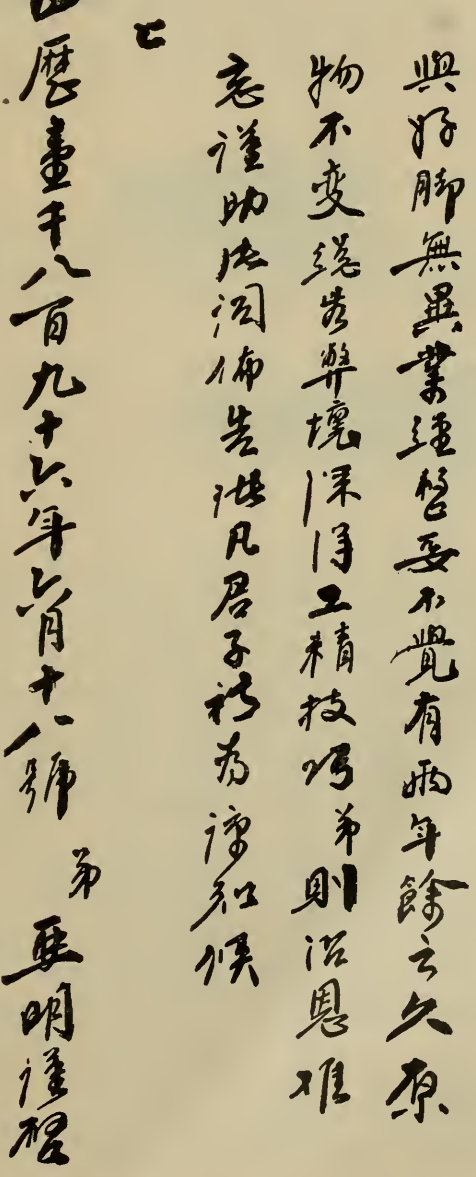
Fitted from Measurements.

WASEDA, TOKIO, JAPAN.

I am desired by His Excellency Count Okuma to inform you that the artificial leg which you made for him reached here some time ago in very good condition. The Count is exceedingly gratified with the admirable workmanship of the leg, and has already made considerable progress in walking with its assistance. The artificial leg suits him remarkably well, and apparently requires no alteration.

Yours truly.

T. KATO.



SOUTH AFRICA.

BELOW-KNEE AMPUTATION.

Fitted from Measurements.

CAPE COLONY, June 16, 1895.

MR. A. A. MARKS:

DEAR SIR:—I am very much pleased with your artificial leg; it is a perfect fit. I have made up my mind never to have an ankle-joint foot again. There are a great many of my friends who would not believe that the leg would be as you advised, unless I went to the factory, but my case has completely altered their opinion. I would almost defy anyone to detect that I am a cripple. The doctor who assisted me with the measurements is so well satisfied with my case, that he is going to order for his other patients. The rigid ankle and rubber foot, and the noiseless action, is not only an agreeable surprise to myself, but more so to those who know me.

Gratefully yours,

W. H. FOREST.

FOREIGN MONEY EQUIVALENTS.

The prices given in our books are in United States money. Parties ordering artificial limbs or supplies can make remittances in their own national money or any money that may be most available. The following table has been computed according to the rates of exchange December 1st, 1899. The rates fluctuate more or less every day, but the variations from the rates given in the table cannot be very great.

U. S. MONEY.		BRITISH.			FRENCH.		GERMAN.		MEXICAN.	
Dollars.	*Cents.*	£	*s.*	*d.*	*Francs.*	*Centimes.*	*Marks.*	*Pfennigs.*	*Pesos.*	*Centavos.*
100	00	20	11	0	518	15	420	20	209	00
75	00	15	8	3	388	62	315	15	158	25
65	00	13	7	1	336	81	273	13	136	85
50	00	10	5	6	259	08	210	10	105	50
40	00	8	4	5	207	26	168	08	83	60
35	00	7	3	10	181	36	147	07	73	65
30	00	6	3	4	155	46	126	06	63	20
25	00	5	2	9	129	54	105	05	52	75
20	00	4	2	3	103	63	84	04	41	80
15	00	3	1	8	77	73	63	03	31	35
10	00	2	1	2	51	82	42	02	20	90
5	00	1	0	7	25	91	21	01	10	45
2	00		8	3	10	36	8	48	4	18
1	00		4	2	5	18	4	24	2	09
	50		2	1	2	59	2	12	1	05
	25		1	0½	1	30	1	06		53
	10			5		52		42		21
	5			2½		26		21		11

STUMP SOCKS FOR ARTIFICIAL LIMB WEARERS.

A stump bears the same relation to an artificial leg that a natural foot does to a shoe. Comfort and cleanliness demand that a sock should be worn on the stump, the same as on the foot.

A sock in either case provides a medium for collecting and absorbing the particles of waste and moisture that are thrown off from the skin, and by removing the socks, airing, and frequently washing them, the stump will be kept in a more healthy condition, and the socket of the leg will be better cared for.

There are persons who do not use socks, but wear their artificial limbs directly to their stumps, and permit the sockets to collect and absorb the excrements of the skin, and when the sockets become foul

No. 1245.

No. 1246.

No. 1247.

with a collection of effete matter, they are scraped out and revarnished. This method cannot be condemned too strongly. The stump, as well as the artificial leg, suffers from such untidy treatment.

Every wearer of an artificial limb should be provided with an ample supply of socks, so that frequent changes can be made. The same regard should be given to the stump as is given to the natural foot. If a stump perspires excessively, changes should be made more frequently.

We manufacture our own socks, and keep a large stock on hand and are able to fill orders promptly. The yarn for our woolen socks is especially prepared at the mills for our purpose. It is the best and softest that can be procured, and absolutely free from cotton or any foreign fiber, and our cotton socks are made of the choicest staple that can be put into thread.

They are made in white or brown, as may be preferred.

Our stock consists of eleven different sizes, ranging from 10 to 36 inches in length, and wide enough to fit any ordinary stump.

In ordering socks, the following measurements of the stump should be given :

Length from body to end.
Circumference of limb close to body.
" 4 inches below "
" 8 " " "
" 12 " " "
" 16 " " "
" 20 " " "
" 24 " " "
" 28 " " "

In drawing a sock on a stump, it becomes expanded. This shortens it in length, therefore, five inches should be added to the length of the stump in order to be sure of having a sock sufficiently long for the purpose.

Some persons use a long sock to extend from the end of the stump to the body, and a shorter one to extend from the end of the stump to the joint (knee or elbow).

When a short one is needed, give only the length and circumferences of that part of the limb that is to be covered.

The following schedule will enable anyone to determine the sizes and the prices of the socks required.

Sizes.			Cotton.		Woolen.	
No.	*Length of Sock, in inches.*	*Circumference at largest part of Stump, in inches.*	*Price, Each.*	*Price, per Dozen.*	*Price, Each.*	*Price, per Dozen.*
0	1 to 10	Under 15	$0.20	$2.00	$0.40	$4.00
1	10 to 15	" 15	.30	3.00	.50	5.00
2	10 to 15	Over 15	.40	4.00	.60	6.00
3	15 to 20	Under 15	.40	4.00	.60	6.00
4	15 to 20	Over 15	.50	5.00	.70	7.00
5	20 to 25	Under 15	.50	5.00	.70	7.00
6	20 to 25	Over 15	.60	6.00	.80	8.00
7	25 to 30	Under 15	.60	6.00	.80	8.00
8	25 to 30	Over 15	.70	7.00	.90	9.00
9	30 to 35	Under 15	.70	7.00	.90	9.00
10	30 to 35	Over 15	.80	8.00	1.00	10.00

One-quarter or one-half dozen sold at dozen rates.

Socks and supplies will be sent by mail free of postage on receipt of price.

WEBBING.

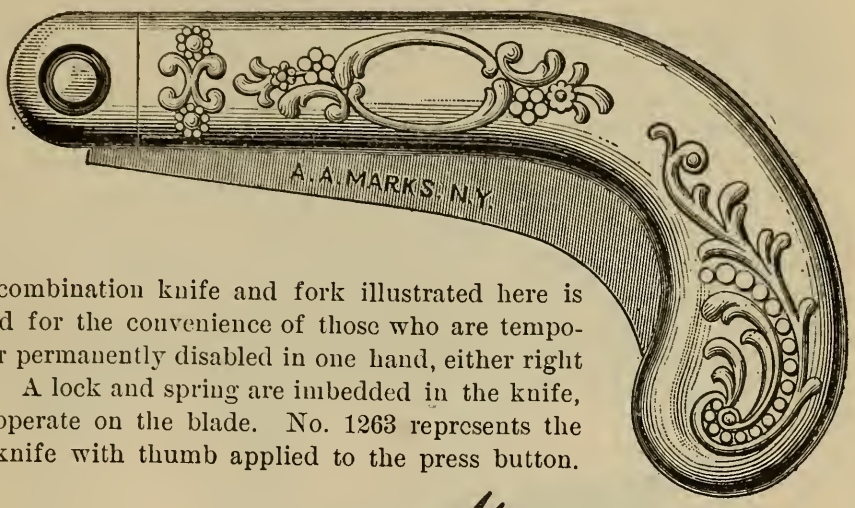
Elastic webbings, 2 inches wide, 60c. per yard; 1½ inch wide, 50c. per yard; 1 inch wide, 40c. per yard.

Non-elastic webbings, 2 inches wide, 30c. per yard; 1½ inch wide, 25c. per yard; 1 inch wide, 20c. per yard.

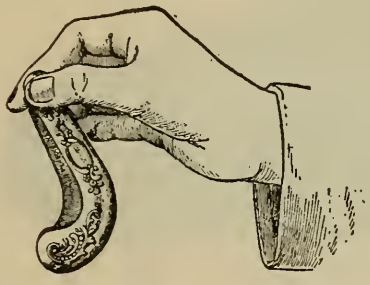
MARKS' IMPROVED KNIFE AND FORK COMBINED.

Operated by a press button. Press the button and the blade flies open.

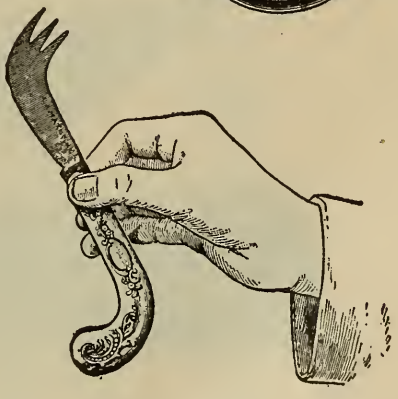
CUT REPRESENTS THREE-QUARTER SIZE.



The combination knife and fork illustrated here is designed for the convenience of those who are temporarily or permanently disabled in one hand, either right or left. A lock and spring are imbedded in the knife, which operate on the blade. No. 1263 represents the closed knife with thumb applied to the press button.

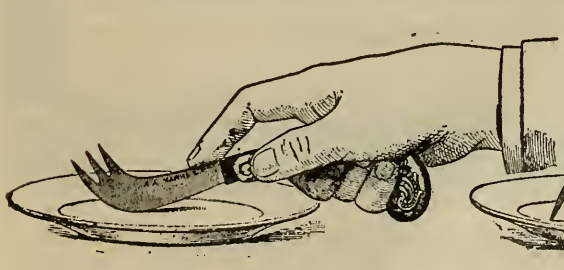


No. 1263.



No. 1264.

The moment a little pressure is applied to this button the blade will fly open and become locked, as shown in No. 1264. When opened, a piece of meat can be cut on the plate by a rolling motion given to the knife, as represented in No. 1265; the knife can be inverted by twisting the hand (see No. 1266), and food conveyed to the mouth by means of the fork. The blade cannot close



No. 1265.

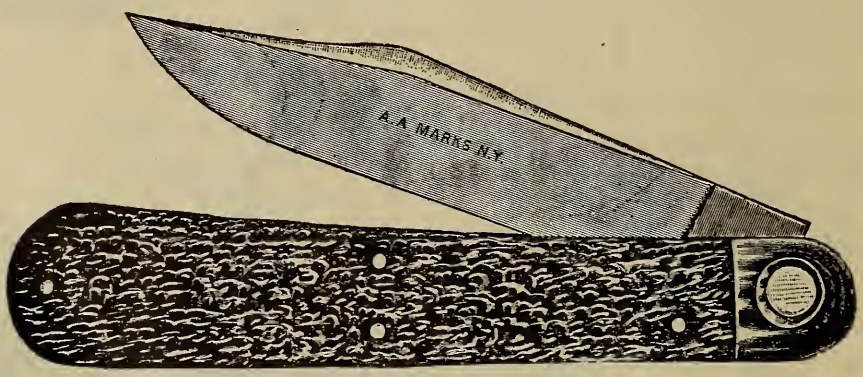
No. 1266.

when pressure is applied to the fork. Butter can be spread upon bread, potatoes mashed, and other services performed. Pressure applied to the press button will release the lock, and the knife can be closed and locked and carried in the pocket. The blade is made of steel, and the handle of aluminum. It is very strong and durable. Price $2.00, postpaid.

THE PRESS-BUTTON POCKET KNIFE.—A HANDY KNIFE FOR ANYONE—ONE HAND DOES IT ALL.

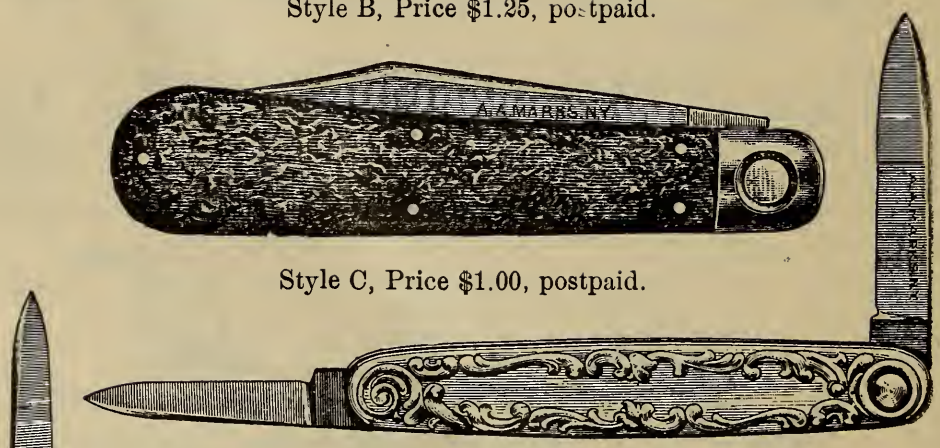
CUTS REPRESENT THREE-QUARTER SIZE.

The press-button feature, as described on the preceding page, is here combined with an ordinary pocket knife. Many persons have broken their nails and made their thumbs sore by pulling open blades by means of the nails. The feature of locking the blade when open, as well as when closed, is another valuable improvement upon the old method. Probably every person who has used a penknife to any considerable degree can recall the experience of having the blade close upon their fingers unexpectedly. The press-button feature removes all these dangers. The knife cannot be opened, and when opened cannot be closed, unless pressure be applied to the press button. The moment pressure is applied, the blade opens and becomes locked. We have a variety of shapes and sizes that we are offering to the public, especially to those who have lost one hand. The blades are made of the finest Sheffield steel.

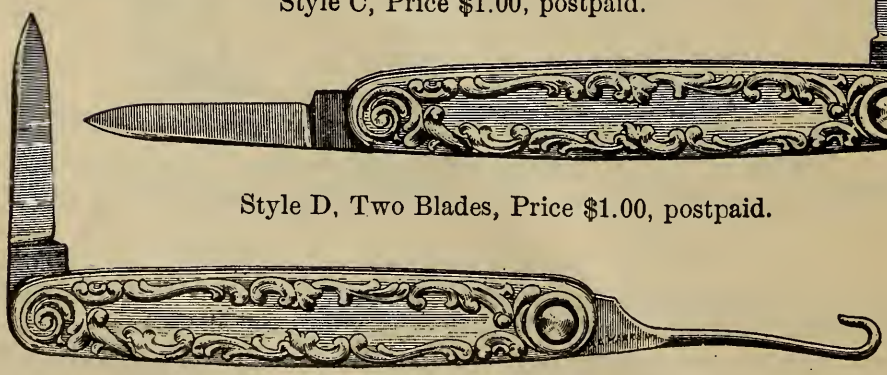


Style B, Price $1.25, postpaid.

Style C, Price $1.00, postpaid.



Style D, Two Blades, Price $1.00, postpaid.



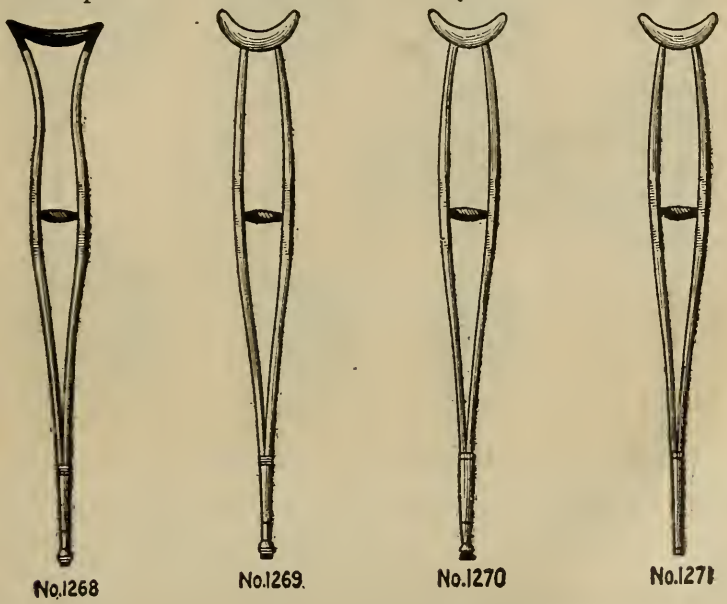
Style E, Blade and Button Hook, Price $1.00, postpaid.

CRUTCHES.

The crutches offered here are of exceptionally good quality; they are neat in design, strong, reliable, and elegantly finished, especial care being given to their construction and the selection of material. Rock maple is found to be the most desirable wood, and is used more abundantly than any other. The grain is straight and tough, the color is light, and when a light-colored crutch is objectionable, we have the wood in some styles stained black walnut. Rosewood is also used; it is a dark-colored wood, and when highly finished makes crutches that are rich and elegant in appearance.

The hand-rests are secured to the side bars by coppered Bessemer steel rods passing through them and riveted to each side bar. This is an improvement upon the older method, viz., placing the hand-rests between the side bars and securing them by screws. Many crutches have broken and let their wearers fall, simply because the hand-rests were not properly secured.

Awarded a Diploma of Honorable Mention by the Paris Exposition, 1900.



No. 1268. Whittemore pattern. Side bars of straight-grain timber, steamed and bent, arm-rest of genuine Peb. goat with an eight-ounce duck lining stuffed with A No. 1 curled hair, and firmly secured to each side bar; the soft top yielding under the weight of the wearer makes a very delightful rest for the arm; patent clamp ferrules style No. 1277 are used. All trimmings nickel-plated. The crutch is elegantly polished.

Price, per pair, rosewood, ... $8.50
" " " rock maple, stained black walnut, . . 7.50
" " " rock maple, natural color, ... 6.50

Single crutch, rosewood, $5.00; stained, $4.50; rock maple, $4.00.

No. 1269. Arm-rest is carved to the shape of a cow's horn and highly polished. It is therefore called the cow-horn crutch; some experienced crutch-wearers say that a hardwood arm-rest, smooth and highly polished, is more pleasant than the padded or soft arm-rest, as it does not wear the clothing or cramp the shoulder as much as other kinds; patent clamp ferrules style No. 1277 are used, full nickel-p'ate trimmings.

Price, per pair, rosewood, with rosewood arm and hand-rests, $8.50
" " " rock maple, natural color, with cherry arm- and hand-rests, ... 4.25

Single crutch, rosewood, $5.00; rock maple, $2.50.

No. 1270, same style as No. 1269, rock maple, except that ferrules No. 1288 are used on bottom, full nickel-plate trimmings.

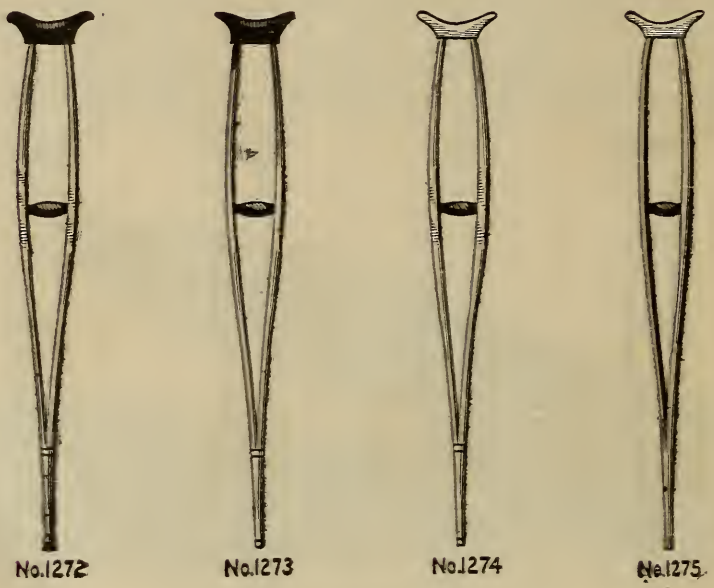
Price, per pair, rock maple, stained black walnut, . . . $4.25
" " " rock maple, natural color, ... 3.25

Single crutch, stained, $2.50; rock maple, $2.00.

No. 1271, same style as No. 1269, except that plain brass ferrules on bottoms are used; plain brass trimmings.

Price, per pair, rock maple, natural color, ... $2.50

Single crutch, $1.50.



No. 1272. Side bars rock maple, cherry hand-rests, arm-rests upholstered with hair covered with enameled leather; ferrules No. 1288 are used, full nickel-plate trimmings.

Price, per pair, rock maple, stained black or ebonized, . . $4.50
" " " rock maple, natural color, ... 3.50

Single crutch, ebonized, $2.50; natural color, $2.00.

No. 1273, same style as No. 1272, excepting that plain brass ferrules on bottoms are used, plain brass trimmings.

Price, per pair, rock maple, natural color, ... $2.75

Single crutch, $1.50.

No. 1274. Side bars, rock maple, cherry hand- and arm-rests, not upholstered; simple brass ferrules on bottoms.

Price, per pair, rock maple, natural color, ... $2.00

Single crutch, $1.25.

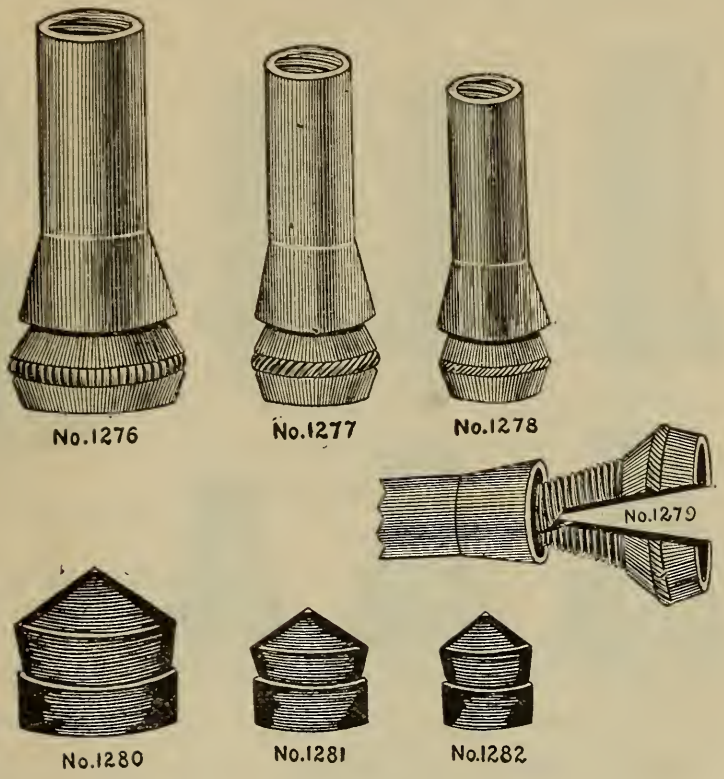
No. 1275. Side bars, rock maple, cherry hand- and arm-rests; side bars are one piece, split from the top to nearly the bottom, where they are riveted; the bottom is without ferrule.

Price, per pair, ... $1.50

Single crutch, $1.00.

CRUTCH FERRULES AND CRUTCH RUBBERS.

CUTS REPRESENT ONE-HALF SIZE.



No. 1276. Patent clamp ferrule, heavy brass, nickel-plated, will screw on the end of a crutch one inch in diameter.

Price, per pair, including No. 1280 tips, ... $2.50

No. 1277. Patent clamp ferrule, heavy brass nickel-plated; will screw on the end of a crutch three-quarters of an inch in diameter.

Price, per pair, including No. 1281 tips, ... $2.00

No. 1278. Patent clamp ferrule, heavy brass, nickel-plated; will screw on the end of a crutch or cane one-half inch in diameter.

Price, per pair, including No. 1282 tips, ... $1.75

No. 1279 merely illustrates the patent clamp ferrule with jaws distended; by unscrewing the jaws they can be opened, when a rubber tip can be placed between them; by screwing them up tightly they will close and hold the tip securely.

No. 1280. Rubber tip, with base one and one-quarter inch in diameter (fit No. 1276 ferrule). Price, per pair, ... $0.30

No. 1281. Rubber tip, with base one inch in diameter (fit No. 1277 ferrule).

Price, per pair, ... $0.15

No. 1282. Rubber tip, with base three-quarters inch in diameter (fit No. 1278 ferrule). Price, per pair, ... $0.10

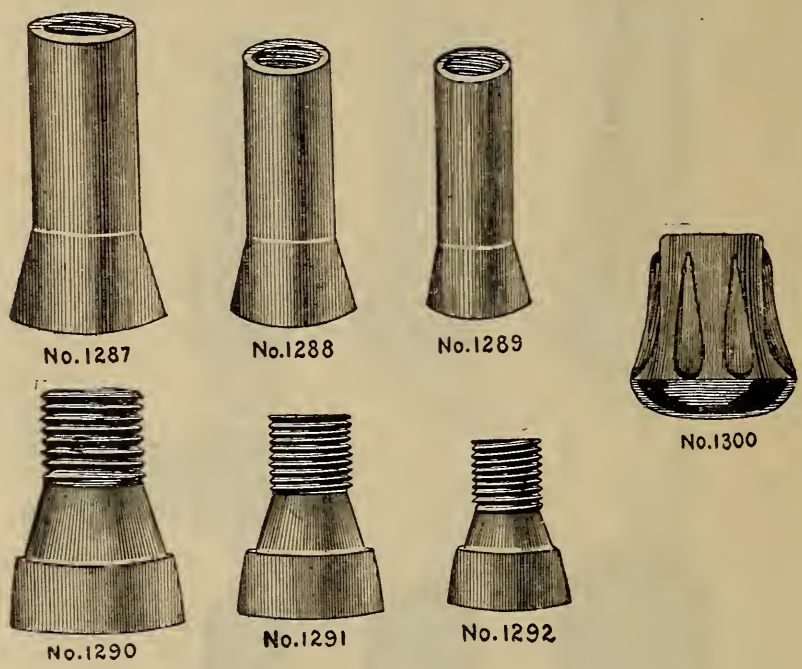
No. 1287. Heavy brass ferrule, nickel-plated; will screw on the end of a crutch one inch in diameter.

Price, per pair, including No. 1290 tips, ... $1.25

No. 1288. Heavy brass ferrule, nickel plated; will screw on the end of a crutch three-quarters of an inch in diameter.

Price, per pair, including No. 1291 tips, ... $1.00

No. 1289. Heavy brass ferrule, nickel-plated; will screw on the end of a crutch or cane one-half inch in diameter.



Price, per pair, including No. 1292 tips, ... $0.75

No. 1290. Rubber screw tip, base one and one-half inch in diameter; will screw in the end of No. 1287 ferrule. Price, per pair, . . $0.40

No. 1291. Rubber screw tip, base one and one-quarter inch in diameter; will screw in the end of No. 1288 ferrule. Price, per pair, . . $0.20

No. 1292. Rubber screw tip, base one inch in diameter; will screw in the end of No. 1289 ferrule. Price, per pair, ... $0.15

No. 1300. Rubber ferrules are made in several sizes to fit the ends of crutches and canes; they slip on the ends of crutches and take the place of brass ferrules; they provide a soft medium between the end of the crutch and the ground; they prevent slipping and obviate noise and marring the floors; they are not as durable as any of the rubber tips previously described.

Prices as follows:

1300—15.	Diameter of hole,	$\frac{3}{8}$ in.,	base,	$\frac{3}{4}$ in.,	per pair,	.	.	$0.20
1300—16.	" "	$\frac{1}{2}$ "	"	$\frac{7}{8}$ "	" "	.	.	.20
1300—17.	" "	$\frac{5}{8}$ "	"	$1\frac{1}{4}$ "	" "	.	.	.20
1300—18.	" "	$\frac{3}{4}$ "	"	$1\frac{1}{4}$ "	" "	.	.	.20
1300—19.	" "	$\frac{7}{8}$ "	"	$1\frac{1}{2}$ "	" "	.	.	.25
1300—20.	" "	1 "	"	$1\frac{1}{2}$ "	" "	.	.	.25
1300—21.	" "	$1\frac{1}{8}$ "	"	$1\frac{3}{4}$ "	" "	.	.	.25

1300—39. Diameter of hole, $1\frac{1}{2}$ in., base, $2\frac{1}{2}$ in., each, . . 1.00
(Suitable for peg legs.)

1300—44. Diameter of hole $1\frac{7}{8}$, in., base, 3 in., each, . , 1.50
(Suitable for peg legs.)

INVALID RECLINING AND ROLLING CHAIRS.

No. 1350 represents an Invalid Reclining Chair. This chair is easily adjustable to any position, from upright to recumbent, that may be assumed by the occupant; and when the desired point is reached, is fastened by means of our new improved cam fastener, which is operated by the occupant.

No. 1350.

Casters are put on each leg. It can be folded readily for packing away or shipment. The foot-board turns up against the leg-rest for convenience in getting into and out of the chair.

The back and seat are caned, the arms wood.

When folded this chair occupies a space forty-five inches long, twenty-four inches wide, and eight inches deep.

DIMENSIONS.

Height of Seat from floor,	20 inches.
Width of Seat,	19 "
Height of Back from Seat,	34 "
Height of Seat from Foot-board,	17 "

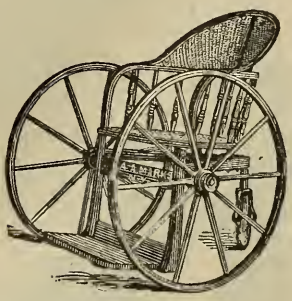
Price, Oak, $13 each; Black Walnut, $14 each. Arms upholstered, $1 extra.

No. 1351 represents an Invalid Rolling Chair. This Rolling Chair is not reclining, but has the same wheels and axles as No. 1355 Reclining Chair, the difference in the construction being in the style of chair used. The chair has no hand rims on wheels as in No. 1355.

DIMENSIONS.

Height of Back from Seat,	21 inches.
Width of Seat,	18 "
Depth of Seat from front to back,	17½ "
Height of Seat from floor,	20 "
Height of Seat from Foot-board,	17 "
Height of Arms above Seat,	10½ "
Height of Wheels from floor,	30 "

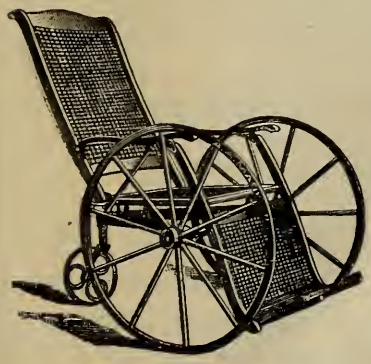
Weight of Chair, about 40 pounds.



No. 1351.

Will pass through a doorway not less than 28 inches wide.

Price, Oak, $16 each. Hand Rims added at additional cost of $2.



No. 1352.

No. 1352 represents an Invalid Reclining Rolling Chair. Although not as desirable as the more expensive ones, it is strong, serviceable, and comfortable, and those unable to purchase the higher-priced chair will find it to answer the same purpose nearly as well. It

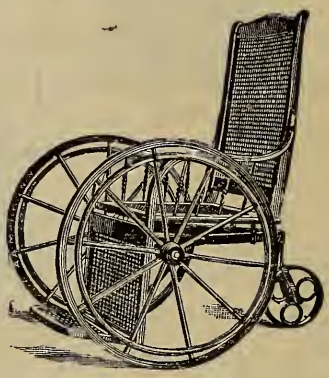
can be used and fastened in any position, from upright to recumbent. Axles and wheels are same as No. 1355, except wheels have no hand rims.

DIMENSIONS.

Height of Back from Seat,	34 inches.
Height of Seat from floor,	20 "
Height of Seat from Foot-board,	17 "
Depth of Seat, front to back,	19 "
Height of Wheels,	30 "
Width of Seat,	19 "
Height of Arms above Seat,	9½ "

Will pass through a doorway not less than 28 inches wide.
Price, Oak, Caned, $25 each. Hand Rims $2 extra.

No. 1353 represents an Invalid Rolling Chair. This Rolling Chair is not reclining, but has the same running parts as No. 1355 Reclining Chair. This chair has hand rims on wheels for street use.



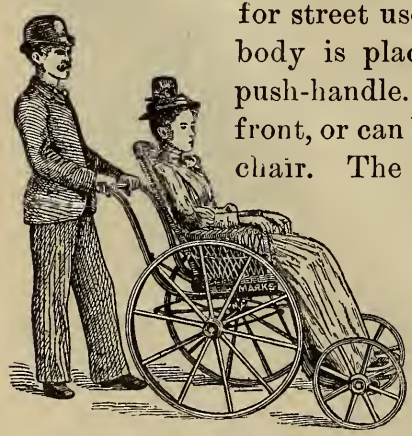
No. 1353.

DIMENSIONS.

Height of Back from Seat,	30 inches.
Width of Seat,	19 "
Depth of Seat from front to back,	18 "
Height of Seat from floor,	20 "
Height of Seat from Foot-board,	17 "
Height of Arms above Seat,	8½ "
Height of Wheels from floor,	30 "

Weight of Chair, about 40 pounds. Will pass through a doorway not less than 28 inches wide.
Price, Oak, $26 each; Black Walnut, $29 each.

No. 1354 represents an Invalid Rolling Chair. This chair is for street use, to be pushed by an attendant. The body is placed on springs, and has a detachable push-handle. The foot-board turns up against the front, or can be used as a step when getting into the chair. The front wheels can be lifted from the ground in passing over obstructions.



No. 1354.

DIMENSIONS.

Height of Back from Seat,	24 inches.
Height of Back Wheels,	28 "
Height of Front Wheels,	13 "
Height of Seat from floor,	23 "
Height of Seat from Foot-board,	16 "
Width of Seat,	18 "

Will pass through a doorway not less than 28 inches wide.
Price, Oak, $31 each.

No. 1355 represents an Invalid Reclining Rolling Chair. This chair is one of the most popular Reclining Rolling Chairs made, and contains all of the improvements. The following illustration shows one of the several positions that it may be placed in.

No. 1355.

DIMENSIONS.

Height of Back from Seat,	34 inches.
Width of Seat,	19 "
Depth of Seat from front to back,	19 "
Height of Seat from floor,	20 "
Height of Seat from Foot-board,	17 "
Height of Arms above Seat,	9½ "
Height of Wheels,	30 "

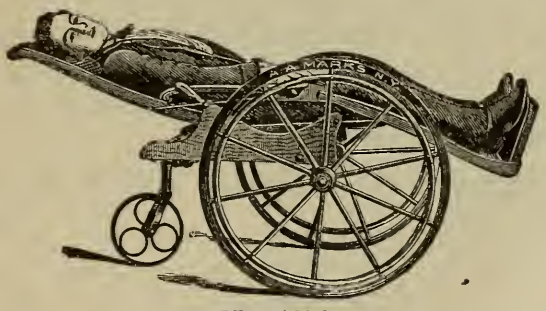
Weight of chair, about 60 pounds.

Caster Wheel 10 inches in diameter. Will pass through a doorway not less than 28 inches wide. Upholstered chairs have the arms upholstered and leg-rest caned.

Prices, Oak, Caned, $34 each; Black Walnut, $37 each; Oak, Upholstered with all-wool Terry, Hair Cloth, or Tapestry, Spring Back and Seat, $42 each; Black Walnut, Upholstered with all-wool Terry, Hair Cloth, or Tapestry, Spring Back and Seat, $45 each. Leg-rest, Upholstered, $2 extra.

No. 1356 represents the recumbent position of chair No. 1355. Any position can be obtained by a little effort on the part of the occupant; a handle, easily grasped by the right hand, can be moved one way or the other in order to fasten the chair in any desired position.

The wheels have hand rims for street use. The tires are half round. The foot-board turns up against the leg-rest for convenience in getting in and out of the chair. This description also refers to Nos. 1357 and 1358.



No. 1356.

No. 1357 is the same as our No. 1355, but with the addition of Tempered Steel Eliptic Springs placed between the seat and gear, thus preventing the jar caused by rolling over uneven ground, and making it very desirable to use out of doors.

DIMENSIONS.

Height of Back from Seat,	34 inches.
Height of Wheels,	30 "
Height of Arms above Seat,	9½ "
Height of Seat from floor,	23 "
Height of Seat from Foot-board,	17 "
Width of Seat,	19 "
Depth of Seat,	19 "

Will pass through a doorway not less than 29 inches wide.

Price, $3, in addition to prices quoted for No. 355.

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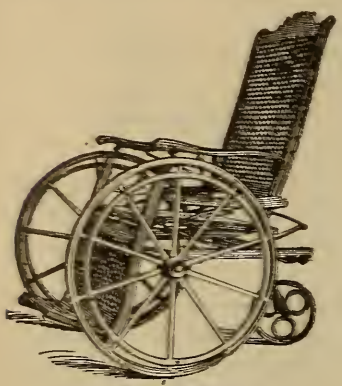
No. 1358 is also the same as No. 1355 with divided extension foot-rest, which is peculiarly suitable for persons who desire to have the foot-rests adjustable and independent of each other. The occu-



No. 1357.

No. 1358.

pant can control the operations of either rest. The foot-rests are not only capable of being placed at different angles, but can be extended to accommodate a long leg.

Price, $5, in addition to prices quoted for No. 1355.

We have chairs of smaller dimensions than the preceding, suitable for children.

Any of the above chairs are now made with ball bearings and pneumatic tires. These improvements will add to the cost of each chair, $25 for each pair of wheels and $12.50 for each single wheel.

Chairs for children or for very heavy persons will be made to order, prices according to the conditions.

These chairs were awarded a Diploma and Bronze Medal by the Paris Exposition, 1900.

Catalogues descriptive of Marks' artificial legs and arms with rubber feet and hands are printed in the following languages: Spanish, French, and German. They are not as comprehensive as the treatise which is printed exclusively in English. They contain, however, the main features of our inventions. A copy of either will be sent free of charge to anyone in any part of the world, upon request.

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